



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

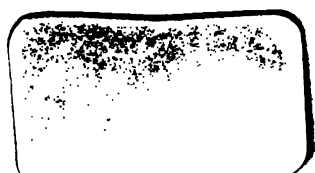
We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>







LEAVES
FROM THE NOTE BOOK
OF
A NATURALIST.

LEAVES
FROM THE NOTE BOOK
OF A
NATURALIST.

BY
W. J. BRODERIP, ESQ., F.R.S.
ETC. ETC. ETC.
AUTHOR OF 'ZOOLOGICAL RECREATIONS,' ETC. ETC.

Farewell, farewell! but this I tell
To thee, thou Wedding-Guest:
He prayeth well, who loveth well
Both man and bird and beast.

THE ANCIENT MARINER.

LONDON:
JOHN W. PARKER AND SON, WEST STRAND.
MDCCC LII.

189. 6. 3.

THE favourable reception accorded to *Zoological Recreations*, and to these pages when they appeared in *Fraser's Magazine*, has induced the Author to consent to the publication of his Notes in their present form.*

London,—December, 1851.

* The dates at the end of the Chapters indicate the time of their appearance in the Magazine.



CONTENTS.

CHAPTER I.

THE Beaver and the Macauco p. 1

CHAPTER II.

Menageries opposed to romance—The Condor—Unprotected state of its eggs—Elevation chosen for their resting-place—Colour &c. of the nestling—The Condor's feast—Indian mode of capturing the bird—Exciting nature of the sport—Humboldt's account of the Condor's tenacity of life—The Lammergeyer—Its pertinacity and audacity—Dimensions of the bird—The Condor's offspring in captivity—Eggs placed under a domestic Hen—Slowness of the hatching process—Description of the young bird—Its food—Attachment of the Hen to its nursling—Death of the young Condor—Modification of instinct—Relative proportions of new-born quadrupeds, birds just hatched, and fishes—Feathers of the Condor used as quills—The King Vulture—Its brilliant colours—Account of a Buzzard hatching chickens p. 8

CHAPTER III.

Transmigration of Souls—The Stork: qualities attributed to the bird by the ancients—Its migration—The White Stork—Metamorphosis of Antigone—Gratitude of Storks proverbial—Heracleis of Tarentum rewarded by a Stork—Supposed

gratitude, chastity, and hatred of infidelity, of the Stork—Its physical structure—Its food—‘Live fish’—Feeding the nestlings—Visits of the Stork to the nests of Wild Ducks—Traditions connected with the White Stork—The Black Stork—Its habits—Colonel Montagu’s specimen—Mode of cooking the Stork—The ‘Adjutant’—The Stork family—General remarks p. 22

CHAPTER IV.

Africa, the country of wonders—Phoenixes and Winged Serpents—The Giraffe—The Hippopotamus at Cairo—Pea-fowl sent to Africa as a present to the King of Dahomy—Expected additions to the Zoological Society’s collection—The Rhinoceros—Cause of its death—The African Elephant—Dimensions given by Major Denham—Manner of hunting the Elephant—Faust—The Hippopotamus—Its osteological organization—Dissection of a Hippopotamus calf—Voracious appetite of the Hippopotamus—Voice of the animal—Shooting excursion—The skin converted into an instrument of torture—Barbarous punishment of offenders—Supposed enmity of the Hippopotamus and the Crocodile—The Hippopotamus a master of the healing art p. 40

CHAPTER V.

A freezing Spring—The American Barn-Swallow—Its nest—Superstition regarding the Swallow—The Chimney-Swallow—Courage of the Purple Martin—Extraordinary migration of birds into Pennsylvania from the South—The English Swallow—Process of taming described by the Rev. W. Trevelyan—Multitudes of insects destroyed by the Swallow—Ancient traditions—Singular medicinal properties ascribed to the Swallow—The Wood Swallow, or *Be-woven* of the Aborigines of Western Australia—Pleasing habits of the Wood-

Swallow, described by Mr. Gould—Its food and general character—Season of Incubation—Form of the nest—Colour and dimensions of the bird—Egg of the White-headed Eagle in the Zoological Society's collection—Niagara a favourite resort of the bird—Its muscular power—Wilson's description of its predatory habits—Franklin's view of the case—Turkeys found by Cortes when he invaded Mexico—The Eagle's unceremonious treatment of the Vulture—The nest of the Eagle—Incubation in captivity—Attachment of the parents to their young in the wild state—The Wedge-tailed Eagle—Its prey—A Kangaroo-shooting party—News from Egypt of the Society's Hippopotamus p. 69

CHAPTER VI.

The Siren, and its classic predecessors—Its generic character—Anatomical account—Description of a male and female—Death of the latter—The Camel—Its wonderful structure—Its adaptation to its state of life—Its noiseless step—The Baggage-Camel—Altered form of its dorsal vertebræ—The Dromedary—Its swiftness compared to that of the high-mettled racer—A lover's exploit—African Camel-drivers—Training of the Camel—Camel-breeding at Pisa—Use of the Camel in ancient war—Holland's account, translated from Pliny—Antipathy of the Horse to the Camel—Madness of the Camel—Reason assigned—Camel fight—Late appearance of the Camel on the Roman arena—Its medicinal properties—Its regular mode of progression—Manner of training the Camel described by old authors—Instance of its cruel treatment by drivers—The Camel-doctors—Diseases to which the Camel is subject—Objects of interest in the Museum of the College of Surgeons, in relation to this animal—Boat planned from its remains—The Pilgrim-caravan—Its glittering array—Construction and formation of the Camel p. 99

CHAPTER VII.

Further remarks on the process of incubation on the egg of the Wedge-tailed Eagle by a domestic Hen—Attempt by the parents to destroy the eggs—Parental care of their young by gregarious quadrupeds—The Reindeer—Fondness for its young—Maternal affection of animals of a high grade—Touchingly instanced in the case of a She-Bear—Boldness of Birds under such circumstances—Example given by White—Parental solicitude of the Partridge—Of the domestic Hen—Of the Mare—The practice of hatching Ducks' eggs by a Hen—Black Swans and their brood—The Canada Geese—Their propensity to destroy the nestlings of other Birds—Instanced by a pair in St. James's Park—The Goldfinch's nest—Perseverance and manœuvring of a Sparrow while nest-building—Anxiety for concealment manifested by Birds generally in the process of nidification—The Ostrich—The mode adopted by this bird of hatching its eggs—Number of eggs produced—Its nest—A Hen's eggs hatched by a Partridge—The Brush-Turkey—Its mode of egg-hatching—Genera of the family—A puzzle to systematists—The bird described—Construction of its nest—Of nests generally—Hunter's experiments on the eggs of a domestic Hen in relation to the eggs of the Brush-Turkey—Gould's remarks and experience on the same subject—Western Australian Pheasant described—Their 'nest-mounds'—The Jungle Fowl described—The Bower-Birds of Australia—Specimens in the Zoological Gardens—Arrival there of the Hippopotamus, the Thylacines, and the Snake-charmers p. 126

CHAPTER VIII.

The *Chlamydera*, or Spotted Bower-Bird—Its range—Opinion of Mr. Gould thereon—Remarkable plumage—The great Bower-Bird—Specimen in the Zoological Gardens—Habits, &c. of the Bird—The Marsupiates, or Purse-Bearers—The

Thylacinus Cynocephalus, or dog-faced Opossum—Specimen in the Zoological Society's Gardens—The Kangaroo—Professor Owen's observations and experiments upon this animal—Remarks thereon—Further account of the Thylacines—Speculations upon the mode of reproduction of the ornithorhynchus and echidna—The Hippopotamus of the Zoological Society—Its organization—Professor Owen's account of the animal alluded to—General appearance and habits described—Sparrman and Mr. Cumming—The mode of capture of the Society's Hippopotamus, and account of its voyage—Its attendants—General remarks p. 155

CHAPTER IX.

Scriptural and classical allusions to Serpents commented upon—Their bite, and its antidote—Snake-charmers—Hasselquist's and Bruce's opinions—The feats of the Arab Snake-charmers at the Zoological Gardens described—The gift of Snake-charming said to be hereditary—The *Spughslang*, or 'Spitting-Snake'—The Asiatic form of this genus of Serpents described—Taming Serpents, as related by Dr. Davy—Captain Knox's experience on this subject—Cingalese veneration for Serpents—Their legends concerning these reptiles—Poison of venomous Serpents, Dr. Mead's opinion thereon—Mr. Bell's experiments, in investigating the anatomy of venomous Snakes—Case of a carpenter bitten by one of these reptiles—Similar instance given by Dr. Mead—His advice in such cases—His mode of curing a Dog—Viper-wine and Viper-broth—Remarks upon the poison and its nature—Authorities cited—General remarks p. 190

CHAPTER X.

Attraction of the reptile house in the garden of the Zoological Society—Fixedness of attitude of the reptiles—Its cause explained—Adaptation of colour of creatures in general to

their haunts instanced throughout the animal creation — Effects of the bite of a Serpent upon two dogs—Remedies adduced—Snakes in the Reptile-house—Discrepancies of Reptile organization—The Land Tortoise described—Their immense size—American mode of immortalizing names—Large Land-Tortoises short-lived in England—White's Tortoise, its peculiarities—Redi's experiments upon the Land-Tortoise—Its enduring vitality instanced—Franklin's Flies—Extraordinary longevity of a Fly—The Land, Marsh, River, and Sea-Tortoises—General remarks p. 228

CHAPTER XI.

The Turtle—Professor Owen's observations—Difference between the Turtle and the Land Tortoise defined—The Green Turtle—Chantrey and Turtle-soup—The 'Alderman's Walk'—A Turtle feast—Supper of Claudius Albinus—Wine-bibbing propensities of the ancient Romans—Use of Tortoiseshell in Rome—Large skull of a Turtle—Remarks on the natural history and capture of Turtles—Sloane's account of a Turtle diet—Labat's opinion thereon—Mode of quieting Turtles, to avoid their bite—Protracted struggle between a slave and a Turtle—Mode of capture—Pliny's account of it—Turtle-divers—A Turtle-chase—Account of the *Remora*—Of Turtles and their uses—Allusions and general remarks in relation to the Tortoise p. 265

CHAPTER XII.

Geological remarks—Fossil foot-prints—Egyptian legends connected with the form of the Crocodile—Methods of capture—Crocodile-executioners—Ancient superstitions connected with the Crocodile—Sacred to the Egyptians—Nature of the Crocodile—Its protectors—Crocodiles destructive of the human race—Sonnini's remarks on the Crocodile—Bait used for

taking it by the ancient fishermen—Crocodiles and gladiators—Supposed medicinal uses of the Crocodile—Peculiarities in the organization of the Crocodilian family—Difference between the Alligator and the Crocodile—Food of the Alligator—Their mode of reproduction—Ravenous and ferocious disposition—Capture of an Alligator, as related by Sir Hans Sloane—The Alligator's habit of swallowing stones—General remarks p. 297

CHAPTER XIII.

The Chameleon—Its habits—Change of colour, and living on air: the former well founded, the latter a fallacy—Hasselquist's experiments—A tame Chameleon—Conclusion as to the principal agent in change of colour—D'Obsonville's opinion—Structure and properties of the colorific stratum of the skin—Mechanism by which changes of colour are effected in the marine animals generally—Form of the Chameleon—Mode of taking its prey—Pliny's account—The Chameleon eaten by the Chinese—Supposed virtue of various parts of the Reptile—Its medicinal properties—The Viper—Its organization—Mode of destroying the tribe—Capture of a Rock-Snake—Its extraordinary dimensions—A Malay crushed to death by a Serpent—Captain Stedman's encounter with a Snake—Kircher's account of the benefit derived by man from the Serpent race—Carver's instances of its docility—Snake-worship—Serpent-idols at Mexico p. 336

CHAPTER XIV.

General remarks upon climate—Condition of the Hippopotamus at the Society's gardens—The great Land-Tortoise there—Escape of the White Bear—Its capture—Improvement suggested in keeping the Reptiles—Serpents, and their food—Supposed virtue of the fat of Serpents—A negro bitten by a

Serpent—Antidote for the bite of the deadly Cobra—Penalty for killing a Fetish Snake—Fascination of Serpents generally believed in America—A pet Toad—Peculiar formation of the tongue of the Toad—A valuable 'bit of its skeleton'—Poisonous exudation from the Toad—Dr. Buckland's experiments—The Zoological Society's Reptile-house on a summer night—Death of the Land-Tortoises in the Society's Gardens—The Crested Pigeons there—Curious organization of the Dove-kind—Parrots, Macaws, &c.; their mode of feeding each other—'Pigeon's milk,' the joke not altogether groundless—Columbidæ—The Passenger-Pigeon—Its power of flight—The Carrier-Pigeon—Its derivation—Proneness to domestication in the tame Pigeon—Breeding-places in the States of Ohio, Kentucky, and Indiana—Vast flights of Pigeons—Fertility of the Dove-kind—Conclusion . p. 374

LEAVES

FROM THE

NOTE-BOOK OF A NATURALIST.

CHAPTER I.

A BEAVER* arrived in this country in the winter of 1825, very young, being small and woolly, and without the covering of long hair that marks the adult animal. It was the sole survivor of five or six which were shipped at the same time, and it was in a very pitiable condition, lean, and with the coat all clogged with pitch and tar. Good treatment quickly restored it to health; it grew apace, plumped out, and the fur became clean and in good condition. Kindness soon made it familiar. When called by its name, 'Binny,' it generally answered with a little low plaintive cry, and came to its owner. The hearth-rug was its favourite haunt in a winter evening, and thereon it would lie stretched out at its length, sometimes on its back, sometimes on its side, and sometimes on its belly, expanding its webbed toes to secure the full action of a comfortable fire on them, but always near its master.

The building instinct showed itself early. Before it had been a week in its new quarters, as soon as it was let out of its cage, and materials were placed in its way, it immediately went to work. Its strength, even before it

* Part of this narrative appeared, by the permission of the author, in *The Gardens and Menagerie of the Zoological Society Delineated*, 1830. A highly interesting and instructive work.

was half grown, was great. It would drag along a large sweeping-brush, or a warming-pan, grasping the handle with its teeth so that it came over its shoulder, and advancing with the load in an oblique direction, till it arrived at the point where it wished to place it. The long and large materials were always taken first, and two of the longest were generally laid crosswise, with one of the ends of each touching the wall, and the other ends projecting out into the room. The area formed by the crossed brushes and the wall he would fill up with hand-brushes, rush-baskets, books, boots, sticks, clothes, dried turf, or anything portable. As the work grew high he supported himself on his tail, which propped him up admirably; and he would often, after laying on one of his building materials, sit up over against it, appearing to consider his work, or, as the country-people say, 'judge it.' This pause was sometimes followed by changing the position of the material 'judged,' and sometimes it was left in its place. After he had piled up his materials in one part of the room (for he generally chose the same place), he proceeded to wall up the space between the feet of a chest of drawers which stood at a little distance from it, high enough on its legs to make the bottom a roof for him; using for this purpose dried turf and sticks, which he laid very even, and filling up the interstices with bits of coal, hay, cloth, or anything he could pick up. This last place he seemed to appropriate for his dwelling: the former work seemed to be intended for a dam. When he had walled up the space between the feet of the chest of drawers, he proceeded to carry in sticks, clothes, hay, cotton-wool, &c., and to make a nest. When he had done this to his satisfaction, he would sit up under the drawers, and comb himself with the nails of his hind feet. In this operation, that which appeared at first to be a malformation was shown to be a beautiful adaptation to the necessities of the animal. The huge

webbed hind-feet of the beaver turn in so as to give the appearance of deformity; but if the toes were straight, instead of being incurved, the animal could not use them so readily for the purpose of keeping its fur in order, and cleansing it from dirt and moisture.

Binny generally carried small and light articles between his right fore-leg and his chin, walking on the other three legs; and huge masses, which he could not grasp readily with his teeth, he pushed forwards, leaning against them with his right fore-paw and his chin. He never carried anything on his tail, which he liked to dip in water, but he was not fond of plunging in the whole of his body. If his tail was kept moist he never cared to drink; but if it was kept dry it became hot, and the animal appeared distressed, and would drink a great deal. It is not impossible that the tail may have the power of absorbing water, like the skin of frogs, though it must be owned that the scaly integument which invests that member has not much of the character which generally belongs to absorbing surfaces.

It has been asserted, and in some degree proved, that the song of birds depends on that which they first hear; but their nest-making seems to be the result of innate instinct. Binny must have been captured too young to have seen any of the building operations of his parents or their co-mates, but his instinct impelled him to go to work under the most unfavourable circumstances; and he busied himself as earnestly in constructing a dam, in a room up three pair of stairs in London, as if he had been laying his foundation in a stream or lake in Upper Canada.

Bread, and bread and milk and sugar, formed the principal part of Binny's food; but he was very fond of succulent fruits and roots. Tender twigs, especially of the willow, were greatly to his taste, and he would handle them very adroitly, drawing them through his

fore-paws, which he closed on them much as a basket-maker would do when trying a twig, though less perfectly of course.

An animal so sociable in his habits ought to be affectionate; and very affectionate the beaver is said to be. Drage mentions two young ones, which were taken alive and brought to a neighbouring factory in Hudson's Bay, where they thrived very fast until one of them was killed accidentally. The survivor instantly felt the loss, began to moan, and abstained from food till it died. Mr. Bullock mentioned to me a similar instance which fell under his notice in North America. A male and female were kept together in a room, where they lived happily till the male was deprived of his partner by death. For a day or two he appeared to be hardly aware of his loss, and brought food and laid it before her; at last, finding that she did not stir, he covered her body with twigs and leaves, and was in a pining state when Mr. Bullock lost sight of him.

With no slight regret I must add a third example in the death of my pet. The housekeeper was very fond of Binny, always consulting his comforts and appetite, making his bed warm, and treating him frequently to Sally Lunn's and plum-cake, till he became the most plump and sleek of beavers; and the attachment was reciprocal. At last, on the writer's departure from London for some time, it was thought that Binny, who had grown excessively fat, would be the better for exercise and change of air, and would be more comfortable if sent to pay a visit to the Tower of London, and expatiate there. Mr. Cops, the keeper of the lions, kindly undertook to take care of him. He was suffered to go at large, and had every accommodation, but soon began to lose his appetite. In vain did his kind host try every delicacy to tempt his guest. With the exception of a few raisins, the dejected animal would eat nothing,

and fell away visibly. Fearing the worst, and suspecting that it was pining for its home, Mr. Cops brought it back to the housekeeper. The poor beaver immediately recognised her, uttered his little cry, and crept under her chair. But the blow had been struck: he never rallied, and died, as the good old housekeeper declared, with tears in her eyes, of a broken heart. His skin is preserved in the museum of the Bristol Philosophical Society. Poor Binny! He was a most faithful and entertaining creature, and some highly comic scenes occurred between the worthy but slow beaver, and a light and airy macauco that was kept in the same apartment.

The macauco was a white-fronted lemur,* and was presented to me by the late Captain Marryat, R.N. From the excessive agility of this sprightly creature, I named him 'Monsieur Mazurier,' to which name, and also to that of 'Macky,' he would answer by a satisfactory grunting noise. His bounds were wonderful. From a table he would spring twenty feet and more, to the upper angle of an open door, and then back again to the table or his master's shoulder, light as a fairy. In his leaps, his tail seemed to act as a kind of balancing pole, and the elastic cushions at the end of his fingers enabled him to pitch so lightly, that his descent was hardly felt when he bounded on you. He would come round the back of my neck and rub his tiny head fondly against my face or ear, and, after a succession of fondlings and little gruntings, descend to my instep, as I sat cross-legged before the fire, when he would settle himself down thereon, wrap his tail round him like a lady's fur boa, and go to sleep. When in his cage, he generally slept on his perch, rolled up with his head downwards, and his tail comfortably wrapped over all. If a piece of orange were given to him, he would lift the fruit to his

* *Lemur albifrons.*

mouth, and throw back his head, so as to secure the juice, not a drop of which was lost. He was very fond of sparkling champagne, and, after such a treat, his friskings and playful tricks were beyond description funny. His game of romps with Binny was most ludicrous. Often while Monsieur Mazurier was seated on my instep, the bell was rung for Binny, who entered as rapidly as his shuffling gait would permit him, immediately came close to my leg, uttered his little cry, and caressed the leg, after his fashion, by rubbing the side of his head and his nose against it. Presently he would perceive Macky, whom he would awake, and endeavour to seduce him to play, by prancing and shuffling before him. Macky, nothing loath, would make a spring on Binny's tail, and bound off in an instant. Upon which Binny would shuffle and prance, shake his head, and play wonderful antics. People may talk of the gambols of a rhinoceros, but the gambols of the rodent threw those of the pachyderm into the shade, beating them hollow in uncouthness and absurdity. Macky would bound on Binny's back, dance a kind of saraband upon him, and then leap before him, upon which Binny would charge the dancer with the most determined heavy alacrity. Macky was over his head and skipping on his great flat scaly tail in a second. Then Binny would shake his head, wheel round like a ponderous waggon, and by the time he had brought his head where his tail was, Macky had bounded from the tables and chairs on and off him twenty times. Binny at last would slap his tail again and again against the floor, till he made all ring, whereupon Macky would dance round him and cut the most extravagant capers, touching Binny's tail with his finger, and jumping away as quick as thought.

They had evidently a good understanding with each other, and were on the best terms. One day they were left at large in a room together, where there was a linen

press, the doors of which had been left open. Macky climbed the doors, ransacked the press, pulled out the sheets, tablecloths, &c., and threw them down to the beaver, who, having made a most luxurious bed, laid himself down thereon; and when the room was entered, Macky and Binny were found fast asleep, the former with his head and shoulders pillowed upon Binny's comfortable neck. When Binny died, I determined to have no more sorrowing for pets, and sent Macky to the Zoological Society's Garden in the Regent's Park, where they got him a wife, with whom he lived long and happily.

The two beavers which were in that garden when I gave the late lamented Mr. Bennett permission to print the account of my domesticated beaver, were sent to the society from Canada by Lord Dalhousie. They were partially deprived of sight before their arrival in this country: but one of them had the use of one eye; and the other, although totally blind, dived most perseveringly for clay, and applied it to stop up every cranny in their common habitation that could admit 'the winter's flaw.' They lived some time together, apparently happy and contented.

January, 1850.

CHAPTER II.

GREAT as have been the advantages of menageries, in bringing immediately under the eyes of every observer animals which would otherwise be hardly known, except from books, or from their remains preserved in museums, they have, it must be confessed, been fatal to romance. The exaggerated proportions which travellers have assigned to birds and beasts—ay, and men—partly from seeing the objects at a distance, and partly from the highly-coloured and, in many instances, imperfectly-understood accounts of the natives, shrink when the living creature is before the spectator. In such cases truth—like the best pictures of the Italian masters, which are not satisfactory at first, especially to those who have admired the extravagances, however poetical, of a Fuseli—looks poorly; and it is only after consideration that the mind becomes reconciled to the light, before which errors and false pretensions vanish.

How many who have read of the condor till he has been almost magnified into the roc of Arabian story, have been disappointed at the first sight of those birds which have been kept so long at the garden of the Zoological Society of London! I can hardly call to mind one who has so seen them in my presence, whose expectations had not gone far beyond what he then saw. To say nothing of more general romantic statements, eighteen feet have been given as the actual measurement across the expanded wings of the great vulture of the Andes. The old male belonging to the society, a very fine specimen, measures eleven feet from tip to tip when his wings are outstretched; his length does not exceed four feet nine inches. Both he and his partner, notwithstanding their

confinement—a confinement which must be peculiarly irksome and unnatural to a bird, the greater portion of whose free life is spent on the wing, sailing in the higher regions of the atmosphere, far above the throne of clouds of the

Giant of the western star,

appear to enjoy good health, proofs of which have been given in their attempts to continue the species notwithstanding their unfavourable situation.

In a state of nature the eggs of the condor are said to rest on the rock, without stick or straw, and unprotected by any border. There, at an elevation of from ten to fifteen thousand feet above the level of the sea, on such ledges and plateaux as 'The Condor's Look-out,' 'The Condor's Nest,' 'The Condor's Roost,' the nestling first breathes the highly-rarefied air. A year elapses, it is asserted, before the downy young one is sufficiently plumed to leave the mother. About the end of the second year the colour is a yellowish-brown, and, up to this time, the *gollila* or ruff is not visible, whence probably arises the notion that there are two species of condors, one black (the colour of the adult), and one brown. Flying to a more lofty pitch than any other bird, and reduced in the sight of the upward gazer, amid the grand and gigantic scenery, to the size of hawks, they wheel round, keeping their telescopic eyes on the valleys, watching for the fall of some failing horse or cow. Then down come the condors to the feast. In their daintiness they generally begin with the tongue and the eyes, but the rage of a hunger sharpened by days of watching on the wing, in the eager air of a very high altitude, is not easily appeased. The bird, rioting in the midst of the plentiful table which death has spread for it in the wilderness, after tearing up the hide with its trenchant beak, carves out and swallows gobbet after gobbet, till it is so gorged as to be unable to raise itself

on the wing. This the Indians well know, and when they have a mind for a battue they set forth a dead horse or cow and quietly watch the progress of the repast, which is sure to be attended by the condors, some of them being almost always on their watch far aloft. When they are well gorged, and looking on each other with gluttonous gravity, the Indians make their appearance with the deadly lasso. Then comes a scene of excitement, gladdening the heart of the sportsman only a degree less than the stimulating bull-fight. The lassos are thrown with more or less success. Some of the birds are noosed, others contrive to scramble away: but when a condor is caught there is a fight, and a stout one, before it is killed; and indeed the stories told of its tenacity of life would be incredible, were they not attested by trustworthy witnesses.

Humboldt shall be called to make out a strong case. He was present when the Indians tried to overcome the vitality of one which they had taken alive. Having strangled it with a lasso, they hanged it on a tree, pulling it forcibly by the feet for several minutes, in a manner that would have done credit to Mr. Calcraft and his assistants. The execution being apparently over, the lasso was removed: the bird got up, and walked about as if nothing had happened. A pistol was then fired at it, the man who fired standing within less than four paces. Three balls hit the living mark, wounding it in the neck, chest, and abdomen: the bird kept its legs. A fourth ball broke its thigh. Then the condor fell, but it did not die of its wounds till half an hour had elapsed. This bird was preserved by M. Bonpland. Such direct and unimpeachable evidence should make us pause before we hastily discredit the accounts of older writers. Ulloa was thought to have used a traveller's privilege when he asserted, that in the colder localities of Peru the condor is so closely protected by its feathery armour,

that eight or ten balls might be heard to strike without penetrating, or, at least, bringing down the bird.

Not that we give credence to the stories of the condors carrying off children—indeed the evidence is against such a statement; and still less do we believe the accounts of their attacking men and women. At all events, Sir Francis Head has proved that a Cornish miner is a match for one of these great vultures. Humboldt allows that two of them would be dangerous foes when opposed to one man; but he frequently came within ten or twelve feet of the rock on which three or four of them were perched, and they never offered to molest him. Indeed the Alpine lämmergeyer,* the *Phenè* of Aristotle and Ælian, is little inferior, if not equal, to the condor in size, and like the condor haunts great mountain-chains. As the condor is the great vulture of the New World, this vulture-eagle holds its throne on the lofty precipices of the old continent. On the Swiss and German Alps, from Piedmont to Dalmatia, in the Pyrenees, in the mountains of Ghilan and Siberia, of Egypt and Abyssinia, this, the largest of the European birds of prey, is on the watch to scourge the country. With more of the eagle than the vulture in its composition, and with claws more fit for rapine than the nails of the condor, it generally seeks for a living prey, and, soaring with its mate above the hills and valleys, pounces upon the lambs and other quadrupeds. The stories of its having carried off children in its crooked talons wear a much greater air of probability than such tales when applied to the condor, with its comparatively impotent foot. The strength of the lämmergeyer and its conformation are quite equal to such murderous acts; for a full-grown one is four feet from beak to tail, and nine or ten in alar extent. But the lämmergeyer contents itself with a dead

* *Gypætus barbatus*, Storr.

prey when no better may be had, and Bruce gives an anecdote of its pertinacity and audacity on one of these occasions so graphically, that it would be unjust to the reader to give it in other than the slandered Abyssinian traveller's own words:—

Upon the highest top of the mountain Lamalmon, while my servants were refreshing themselves from that toilsome, rugged ascent, and enjoying the pleasure of a most delightful climate, eating their dinner in the outer air, with several large dishes of boiled goat's flesh before them, this enemy, as he turned out to be to them, appeared suddenly. He did not stoop rapidly from a height, but came flying slowly along the ground, and sat down close to the meat, within the ring the men had made round it. A great shout, or rather cry of distress, called me to the place. I saw the eagle stand for a minute, as if to recollect himself, while the servants ran for their lances and shields. I walked up as near to him as I had time to do. His attention was fully fixed upon the flesh. I saw him put his foot into the pan, where was a large piece in water, prepared for boiling; but finding the smart which he had not expected, he withdrew it, and forsook this piece which he held.

There were two large pieces, a leg and a shoulder, lying upon a wooden platter; into these he trussed both his claws, and carried them off; but I thought he looked wistfully at the large piece which remained in the warm water. Away he went slowly along the ground as he had come. The face of the cliff over which criminals are thrown took him from our sight. The Mahometans that drove the asses, who had suffered from the hyæna, were much alarmed, and assured me of his return. My servants, on the other hand, very unwillingly expected him, and thought he had already more than his share.

As I had myself a desire of more intimate acquaintance with him, I loaded a rifle gun with ball and sat down close to the platter by the meat. It was not many minutes before he came, and a prodigious shout was raised by my attendants, 'He is coming! he is coming!' enough to have discouraged a less courageous animal. Whether he was not quite so hungry as at first, or suspected something from my appearance, I know not, but he made a small turn and sat down about ten yards from me, the pan with the meat being between me and him. As the field was clear before me, and I did not know but his next move might bring him opposite to one of my people, and so that he might actually get the rest of the meat and make off, I shot him with

the ball through the middle of his body, about two inches below the wing, so that he lay down upon the grass without a single flutter.

Bruce gives the following dimensions of this daring bird :—

From wing to wing he was eight feet four inches ; from the tip of his tail to the point of his beak, when dead, four feet seven inches ; he weighed twenty-two pounds, and was very full of flesh.

But return we to our condor. It affords pregnant evidence of the care and attention exerted by the authorities and keepers of the animals confined in the garden of the Zoological Society of London in the Regent's Park, when we find that so many of them have not only shown a disposition to breed in their captivity, but that not a few have actually reared healthy offspring, under all the disadvantages which a life so different from that intended by Nature must, under any circumstances, produce. Some of these instances, if our notes find favour in your eye, dear reader, will be hereafter given. At present we beg attention to one where, with every wish to continue the species, the parents seemed to give up incubation as hopeless.

At the time the present note was taken the female condor in the Regent's Park had laid seven eggs. The first was laid on the 4th of March, 1844; the second on the 29th of April of the same year; the third on the 28th of February, 1845; the fourth on the 24th of April in that year; the fifth on the 8th of February, 1846; the sixth on the 3rd of April, 1846; and the seventh on the 7th of May, 1847.

On one occasion I saw the condors with a newly-laid white egg, some three or four inches long, lying on the naked floor of their prison. There was no appearance of a nest of any kind, and there was something melancholy and yet ludicrous in the hopeless expression with which both the parents looked down at it. They regarded the

egg and then each other, as if they would have said if they could, 'What are we to do with it now we have got it?' And the mute mutual answer of their forlorn eyes and dejected heads was, evidently, 'Nothing.'

Well, at last it was proposed that as soon as another egg was laid it should be placed under a hen. Accordingly, on the 7th of May, at half-past seven o'clock, A.M. (I must be pardoned for being somewhat particular on such an occasion), the newly-laid egg was put under a good motherly-looking nurse of the Dorking breed, and as the colours of hens as well as of horses are worthy of note, let it be remembered that her colour was white inclining to buff.

The place of incubation was a cage elevated some distance above the floor in one of the aviaries. The hen sat very close. Day after day, week after week, passed away; still the excellent nurse continued to sit. Day after day, week after week again rolled on, and the usual period at which the anxious feathered mother beholds her natural offspring was left far behind. Still the good nurse sat on, till at last, after an incubation of *fifty-four* days, the young condor, on the 30th of June, 1846, about six o'clock in the morning, began to break the wall of its procreant prison. The process of hatching was very slow. The young bird was not extricated from the egg until after twenty-seven hours, nor was it then released—on the morning of the 1st of July—without the assistance of the keeper, who found it necessary to remove the shell, as the membrane had got dry round the nestling. Thus came into this best of all possible worlds the first condor hatched in England. It had an odd appearance, and seemed to wonder how it had got here. The head appeared to be misshapen, for on the top of it was what looked like an amorphous bladder of water, contained between the external skin and the skull. This gradually disappeared, and when I first saw it, on the same 1st of

July, about four o'clock in the afternoon, the head was properly shaped. It was naked, and of a dark lead colour; and such was the hue of the just visible comb (showing that it was a male), and of the naked feet. With these exceptions the young bird was covered with a dirty white down, and looked healthy and vigorous. On the evening of the day on which it was hatched it ate part of the liver of a young rabbit.

The young condor was fed five times each day with the fleshy parts of young rabbits; at each feed, a piece about the size of a walnut was given, and it was very fond of the liver. For the first ten days it was fed, and after that time it pecked the food from the hand of the keeper. It took no water, nor was any forced on it.

I find, also, the following in my note-book :—

July 18.—The young condor continues to thrive apace, and the good hen that hatched the egg from which this portentous chick sprung still remains in the elevated cage, and seems very much attached to her charge. When feeding,—for which purpose she quits the nestling only twice a-day, hurrying back as if anxious to resume her duty—she is fussy and fidgetty (if there be such words) till her hasty meals are ended. The young condor's down is now changed to a more grey hue, and the germs of the true feathers begin to show themselves. The head and neck have become blacker, and the budding excrescence of the comb advances. The upper mandible of the bill is slightly moveable. The lower extremities are become darker and very stout, but as yet too weak to support the bird's weight.

May not this local, but no doubt natural weakness, point to the solution of the continued close attention of the hen? Her duty with her own eggs is to hatch chickens that run very soon after they have left the egg-shell, but till they are strong enough to be able to trust to their lower extremities she keeps them close, 'hiving

them,' as the old wives say, carefully, till these lower extremities, which are, in the nestlings of the gallinaceous tribe, first well developed, shall be sufficiently strong to carry them in search of food and out of danger. The hen, in this instance, finds that her Garagantua of a chick cannot walk, and therefore goes on cherishing it and sitting close over it. I saw it fed about three o'clock in the afternoon upon part of a young rabbit, nearly the whole of which it had consumed in the course of yesterday and to-day. When brought out it shivered its callow wings and opened its mouth like other nestlings, but it *then* uttered no cry. It made much use of the tongue in taking the food and in deglutition.

On my return from making these observations I went to look at the old condors. Military bands were playing, and the wind was very high. Both birds were very much excited, the male especially. He spread and flapped his wings, pursuing the female, as she walked backwards from him, with his beak opposite and close to hers, and gesticulating vehemently and oddly.

The next entry is a sad one :—

July 21, 1846.—The young condor, after thriving well to all appearance, died this morning. The good hen, which had been most attentive to it to the last, seemed to miss it much. The cry of the young condor resembled the squeak of a rat, and the dwelling-place of the hen and her charge was infested by those predaceous rodents. Sometimes they would squeak, and then the bereaved foster-mother would approach the hole whence the squeak proceeded, listen, and abide there clucking, as if in hope of seeing her charge come forth.

In this case I was struck with the modification of instinct, or rather of the adjunct of something closely resembling a reasoning power, on the part of the hen. In general, as soon as the days of her incubation are fulfilled the hen leaves the nest, if the eggs are addled, or have

not been hatched from some other cause. But here she continued to sit more than double the usual time without moving except for the purpose of taking food. Might it not be that she felt that life was in progress under her, and that her *στοργή* (*storge*) prevailed with her not to abandon the embryo till the fulness of its time was come?*

Again I observed that she made no attempt to solicit the young condor to feed, as hens do with their own chickens. She seemed to regard it as something incomprehensible, but belonging to her; and looked on with

* 'We cannot but admire with Harvey,' says Willughby, 'some of these natural instincts of birds, viz., that almost all hen-birds should, with such diligence and patience, sit upon their nests night and day for a long time together, macerating and almost starving themselves to death; that they should expose themselves to such dangers in defence of their eggs; and if, being constrained, they sometimes leave them a little while, with such earnestness hasten back to them and cover them. Ducks and geese, while they are absent for a little while, diligently cover up their eggs with straw. With what courage and magnanimity do even the most cowardly birds defend their eggs, which sometimes are subventaneous and addle, or not their own, or even artificial ones. Stupendous, in truth, is the love of birds to a dull and lifeless egg, and which is not likely with the least profit or pleasure to recompense so great pains and care. Who can but admire the passionate affection, or rather fury, of a clocking hen, which cannot be extinguished unless she be drenched in cold water? During this impetus of mind she neglects all things, and, as if she were in a frenzy, lets down her wings, and bristles up her feathers, and walks up and down reckless and querulous, puts other hens off their nests, searching everywhere for eggs to sit upon; neither doth she give over till she hath either found eggs to sit or chickens to bring up; which she doth with wonderful zeal and passion, call together, cherish, feed, and defend. What a pretty ridiculous spectacle is it to see a hen following a bastard brood of young ducklings (which she hath hatched for her own) swimming in the water? How she often compasses the place, sometimes venturing in, not without danger, as far as she can wade, and calls upon them, using all her art and industry to allure them to her.'

evident complacency when the keeper took it out to feed it on raw flesh, receiving it, after its meal, under her wings with a comforting cluck.

It is a well-known aphorism that the more perfect the order of the animal is, the larger is the size of its offspring when it first enters into life. Thus, as John Hunter observes, a new-born quadruped is nearer to the size of the parents than a bird just hatched, and a bird nearer than a fish. Something may be, therefore, attributed to the disproportioned bulk of the young condor; but true as the maxim is, it does not follow that the parent has the power of distinguishing size. In birds such a power probably does not exist; for we know that the hedge-sparrow and other small birds will go on feeding the enormous young cuckoo till the poor benevolent dupes are almost exhausted, before and after the intruder has shouldered out their own eggs and little nestlings.

The sight of the helpless young condor could not fail to raise reflections in the most unobserving. There was the comparatively minute form, which, if its life had been spared, would have been developed to gigantic proportions; and that little, feeble, plumeless wing, was formed to bear quill-feathers from two to three feet in length. These noble quills are used as pens in the Cordillera; and in this country I have seen them transformed into floats for the angler, of a size and finish to satisfy the most fastidious dandy disciple of good honest Izaak Walton.

Two other raptorial birds come into the group, though one of them, the Californian vulture, wants the caruncle which distinguishes the condor. The other is the king of the vultures.* The brilliant colours of the head and neck of this last project it upon the notice of the visitor who passes the place of its confinement; and there is

* Or, King Vulture—*Sarcoramphus Papa*—*Vultur Papa*, Linn.

reason for believing that the stories told of the other vultures, in their free and natural state, standing respectfully aloof till their king has finished his repast, are not groundless, the respect being probably due to the superior courage of the monarch.

Of the condors, two males and one female are now alive in the garden of the society; but no egg has been laid since that whose history we have attempted to give was deposited.

In the same garden the king vulture—this looks very like poor dear Theodore Hook's story of the cock maccaws laying eggs—has laid, but it never sat. The Chinese vulture has done the same, but never attempted incubation. The wedge-tailed eagle of New Holland, and the lämmergeyer sighing for her mate and her mountains, have dropped eggs, but never attempted incubation. The eagle owl* entered upon the business of the continuation of the species with greater energy and gravity. She laid and sat, but sat in vain: not an owlet rewarded her anxiety.

The white-headed eagles seemed very much in earnest. Of them the reader may know more hereafter, if he should choose to kill time by looking upon these pages.

This, we are told, is a world of compensation, though the compensation is too often terribly on one side, as in the often-repeated case of Englishmen being called upon to pay for 'the vested interests' of a nuisance that would not be tolerated for three months in any city of civilized Europe except London—Smithfield Market, for instance. But still this best of all possible worlds is a world of compensation. In obedience to this law, Mr. Yarrell, in his excellent *History of British Birds*, has recorded a most interesting account of a buzzard† hatching chickens,

* *Strix Bubo.*

† *Buteo vulgaris.*

in order, no doubt, to balance the fact of a hen hatching a condor.

A solitary male buzzard in our time made desperate love to the shoe of the gardener of the Physic Garden at Oxford, with the gardener's foot in the said shoe; but Mr. Yarrell's story relates to the gentler sex, and he prefaces it with an observation as to the extreme partiality of the common buzzard for the seasonal task of incubation and rearing young birds.

The bird mentioned by Mr. Yarrell was kept in the garden of the Chequers, in the good town of Uxbridge, of ineffectual Treaty memory. The poor bird—she was well known to many a brother of the angle, 'now,' as old Izaak hath it, 'with God'—manifested her inclination to frame a nest by gathering and twisting about all the loose sticks she could lay beak and claw on. The good master of the house had compassion on her, furnished her with twigs and all appliances and means to boot, and the solitary creature went to work and completed a nest. Two hens' eggs were put under her; she hatched them well and reared them bravely. Her desire to sit was indicated by scratching holes in the garden, and breaking and tearing everything within reach of beak and talons. Year after year did she hatch and bring up a goodly troop of chickens, and in 1831 her brood consisted of nine, after the loss of one, for she had brought out ten. Upon one occasion her kind master, to save her from what he thought the *ennui* of sitting, put down to her a newly-hatched lot—luckless little ones, she destroyed every chick of them. The good man did not know the animal economy, which makes the application of the eggs to the inflamed breast of the female bird a balm, rendering this labour of love twice blessed, and leading in its train all the maternal charities. The ready-made nestlings were treated as intruding impostors; her own foster-chicks no honest barn-door chuckie

was ever more attentive: only when flesh was given to her and she broke it up for her young family, she appeared mortified that, after taking a few morsels, they left her and her carrion to pick up the grain with which they were supplied.

Have we not something to answer for in confining God's creatures in solitude, where they cannot fulfil the divine command?

February, 1850.

CHAPTER III.

IF any philosopher should gird himself to the task of tracing the vagaries of the *Transmigrating Ens*, as it has been termed, and following the spirit through its various phases, he would have an amusing but a puzzling time of it, even though he took Pythagoras for his guide. And yet that doctrine of the Metempsychosis, founded not improbably on the growth, dissolution, and regeneration of animal and vegetable natures, raises thoughts not to be hastily cast away. It mingles with our reasonings, be they grave or gay; suggests itself to Hamlet when he discourses of imperial Cæsar, and to the wag who, after decking the last resting-place of Quin with thyme and pot-marjoram, breathes the pious aspiration,—

And fat be the gander that feeds on his grave.

Bodies die but to revive. The carcass, uncontaminated by medical efforts to cheat the worm, soon swarms with animal life in a different form; and the decayed vegetable revives in the mucor which bursts from its dead fibres, to say nothing of the hosts of minute insects which live, and move, and have their being upon its remains. And this, be it remembered, is only the first stage patent to all eyes. But who shall say that when the cycle is completed, the dead body may not live again as a perfect animal or vegetable,—more perfect than when the sun first shone upon it in its nascent state?

In truth, all sublunary nature is apparently so full, that one may well understand the notion that the quantity of matter is infinitesimally small, and the volume of spirit enormously great. Jupiter, it is said, seeing this, threw down a capacious handful of souls upon this *petit*

tas de boue, and left them to scramble for the few bodies open to them.

If such tales be true, happy must the struggling soul have been that worked its way into the egg of a stork, that personification of all the virtues. Gratitude, temperance, chastity, piety,—these were a few of the qualities attributed to the bird by the ancients. Welcome everywhere, and bearing a charmed life, it was and is hailed as the harbinger of spring and the destroyer of evil things. Even the Dutchman grows animated when he sees the stork return to the well-known nest, and expresses his pleasure at beholding the snowy wader stalk about his polders by a reduplication of puffs from his eternal pipe. Nay, he has been known on such an occasion to withdraw the reeking tube from his lips for a moment, and ask the frogs how they liked their new king?

The disappearance of the storks in the winter, and their reappearance in the spring, gave rise to the same tales of brumal hybernation as were long rife about the swallows; and stories were told of a concatenation of storks, joined head and tail together, having been fished out of the water. The Lake of Como, if we recollect right, was one of the hybernacula out of which they were declared to have been taken, apparently dead, but revived by the fishermen, who restored animation by placing them in a warm bath. And yet Pliny had no doubt about their migration, and as little that they arrived from a great distance, though he says that in his time it was not known from what country they came or whither they retired. Old Belon, however, well knew that Africa was the locality of their winter quarters; and he gives evidence of their having been seen whitening the plains of Egypt in September and October. The same excellent ornithologist—blessings on him for a good observer—beheld a large flock of them in the act of

migration when he was at Abydos, in the month of August. They came from the north, and when they arrived at the Mediterranean Sea they wheeled round and round, then broke into companies, and proceeded no longer in one body. Dr. Shaw, in his journey over Mount Carmel, saw them coming from Egypt in flocks extending half-a-mile in breadth, each of which occupied three hours in passing over. There are stories of their being heralded in their flights by crows, who lead the way; others, again, say that a deadly enmity exists between the two races, and that stout battles have been witnessed between the storks and crows in Egypt.

The advent of the crows is announced by their cries, but the stork utters no vocal sound. This silence probably gave rise to the notion entertained by the ancients that the storks had no tongue. Their ordinary mode of communication is by clattering the mandibles like a pair of castanets.

This peculiarity was known to the ancients.

Ipsa sibi plaudat crepitante ciconia rostro,

writes Ovid (*Metam.* vi. 97), and Dante refers to it in his description of the agonies of the guilty in the place of weeping and gnashing of teeth,—

Eran l'ombre dolenti nella ghiaccia ;

*Mettendo i denti in nota di Cicogna.**

Large are the assemblies and sonorous the clatterings that precede their autumnal migration. The quaint Philemon Holland thus renders Pliny's account of one of these gatherings, and making allowance for the time when the Roman wrote, there is little in it that has not been certified by modern observers :—

When they be minded (writes the translator of *Plinies Natural History*)—when they be minded to part out of our coasts, they assemble all together in one certain place appointed : there is not

* *Inferno*, canto xxxii. l. 35, 36.

one left out nor absent of their owne kind, unlesse it be some that are not at libertie, but captive or in bondage. Thus (as if it had been published before by proclamation) they rise all in one entire companie, and away they flie. And albeit well knowne it might be afore that they were upon their remove and departure, yet was there never any man (watched he never so well) that could perceive them in their flight: neither do we at any time see when they are coming to us, before we know that they be alreadie come. The reason is because they doe the one and the other alwaies by night. And notwithstanding that they flie too and fro from place to place and make but one flight of it, yet be they supposed never to have arrived at any coast but in the night. There is a place in the open plaines and champion countrey of Asia, called Pithonos-Come: where (by report) they assemble all together, and being met, keep a jangling one with another: but in the end, look which of them lagged behind and came tardie, him they teare in peeces, and then they depart. This also hath been noted, that after the Ides of August they be not lightly scene there.

Some affirme constantly that storke have no tongues. But so highly regarded they are for slaying of serpents, that in Thessalie it is accounted a capitall crime to kill a storke, and by law he is punished as a felon in the case of manslaughter.

In Oppian's time the knowledge of the whereabouts of the storks had somewhat advanced, for he speaks of accounts of some flying from Lycia, and others from Ethiopia. But however doubtful the ancients may have been as to the place where these birds passed the winter, none but those who delighted in marvels rather than facts discredited their migration. Long before the time of Pliny and Oppian it had been written,—‘Even the storke in the aire knoweth her appointed times, and the turtle and the crane, and the swallow, observe the time of their comming.’*

Turn we now to the romantic history of the white stork. Laomedon's lovely daughter, Priam's charming sister, who shone among mortal virgins like the moon amidst the stars, vaunted in her pride that she was more

* Jerem. viii. 7. ‘Imprinted at London by ROBERT BARKER, Printer to the King's most *Excellent Maestie*, 1615.’

beautiful than the queen of heaven. Juno, who was not remarkable for patience under such insults, uttered the fiat of degradation; and poor Antigone found her delicate nose and exquisite mouth elongate into a red horny beak, and her fair body stilted up on two lofty skinny red legs, with nothing but the flattened nails at the end of her attenuated toes, to remind her of limbs cast in the most perfect feminine mould. This form of the nails did not escape Willughby, who says, writing of the bird,—‘Its claws are broad, like the nails of a man; so that *πλατυώνυχος* will not be sufficient to difference a man from a stork with its feathers pluckt off.’ Poor Antigone! Instead of a king’s board graced with every delicacy, her table was to be thereafter spread in the wilderness. But the irritable and jealous goddess seems to have had some touch of mercy; for, according to the legends, she left the transformed all her virtues and amiable qualities when she punished her insolence. Gratitude, temperance, chastity, piety, were some of the bright spots left to console her for her otherwise dark lot; and they have, it would seem, adorned the species ever since.

Of the gratitude of storks, there are stories enough to fill a volume. They were said, on their annual return to their nests on the house-tops, regularly to throw down to their landlord one of their young ones by way of rent or tribute,—an act of justice executed a little at the expense of their parental character. Well, if you are not inclined to believe this, best of readers, listen to the story of Heracleis of Tarentum, the good, the chaste, the pious Heracleis. She, when the angel of death smote her beloved husband, wept long and sorely, but not like her of Ephesus. No, she could no longer endure the sight of the empty chair and the widowed couch, but set up her abode at her husband’s tomb. Here, as she sat in her sorrow on a lovely summer’s day, when all was smiling but the dejected widow, she beheld a pair of storks

teaching their young ones to fly. A weakling of infirm wings fell to the ground and broke its leg. Heracleis had suffered too much herself not to feel compassion for the suffering of other creatures; so she cherished the young bird, bound up its wounds, applied healing remedies, and when the cure was completed, gave it its liberty. Away it flew; and as she watched its departure with a sigh, she was again left alone with her grief.

The next year, as she was sitting at the door of the tomb, with her pale features and mourning robe, bathed in the beams of a vernal sun, she beheld at a distance a stork skimming low along the ground towards her. On came the bird—as it approached she recognised her patient; and now it gently hovered over her, dropped from its beak a stone into her lap, and departed. The poor widow wondered what this might mean; but struck with the action, she took the stone in and laid it down. At night the place shone as if illuminated by torches, the radiant effulgence proceeding from the precious gem—brighter than that mountain of light the koh-i-noor diamond—which the stork had brought from distant lands to his benefactress.

Stuff, sir!


Well, madam, if you will not believe Ælian, here is 'Another Account,' as the best possible public instructors say.

A good-for-nothing fellow threw a stone at a stork and broke its leg. The poor stork got to its nest, and there lay. The women of the house fed it, set its leg, and cured it, so that it was able at the proper season to fly away with the rest. Next spring, the bird, which was recognised by the women from the kink in its gait, as the sailors say, returned, and when they, attracted by its gesticulations, approached, dropped gratefully at their feet from its bill the finest diamond it had been able to pick up in its travels.

Then there was the ancient stork, that had nested for I don't know how many years on one particular house. This well-bred bird never returned in the spring without stalking about before the door, and clattering his bill till the master came out, when stork clattered more than ever, as much as to say,—‘The top of the morning to you, sir; here I am again.’ To which the master would reply,—‘Ah! old fellow, how are you?’ When autumn came the same ceremony was gone through; the stork clattering,—‘Good bye, your honour;’ and the master saying, ‘A pleasant journey to you, old boy.’

Another ancient, not contented with mere empty greeting, is stated to have brought every time he returned a root of ginger, which, after a sufficient exordium of clattering, was disgorged as a new year's gift to the master of the house.

Every one knows the story of the little dog that brought a bigger one to revenge his wrongs upon an overgrown bully; but Oppian caps this, when he tells us, that once upon a time a huge serpent contrived year after year to insinuate itself into the nest of a stork, and destroy its young. At last the bereaved parents brought back with them another bird which had never been previously seen, shorter than a stork, but with a great sharp sword-like beak. When the nestlings were ripe for slaughter, forth crept the serpent; but this time he was confronted by the warlike ally, and a fierce combat ensued between the bird and the reptile, which at length terminated in the death of the murderous aggressor; not, however, with impunity on the part of the defender of nestlings, which suffered so severely from the poisonous bite of the snake that all its feathers fell off. The grateful storks seeing this, would not leave their benefactor to his fate, but cherished him, and delayed their departure till his feathers grew again, and he was able to accompany them; when the whole party flew away together.



Of their love of chastity and hatred of infidelity, which they punish with the utmost severity, the ancients tell equally edifying tales. Does a storkess go wrong, her stork finds it out and takes no notice to her; but quietly flies off and brings a crowd of avengers with him, who tear the adulteress to pieces. Beware all ye on whose house-top a stork nestles. Be sure he will find your sin out. The slave was very joyous with his beautiful but frail mistress in the absence of his master; till, one fine morning, the stork of the house, taking him at advantage, flew at him and pecked his eyes out.

When the storks return, the males are said to precede the females some days, during which time they refit the nests, and make all ready and comfortable for their better halves. And when these arrive, each flying to her own mate—ye gods! what billing, and clattering, and hymeneal joys do abound, if we are to believe the old chronicles.

For temperance, too, the stork was as highly praised by the ancients as Father Mathew is by the moderns.

But the piety of the bird! Ah, there was its strong point. Did it not give the hint for the *Leges Ciconiarum*, by which children were compelled to support their parents, and are they not law to this day? If you doubt, turn to the *Birds* of Aristophanes, and his sharp satire upon the unplumed biped there extant.

Did not the pious Æneas, when he bore the good Anchises on his shoulders, learn from the stork, which, even when danger did not threaten, and his aged parent had been obliged to take to the nest again in his second chickhood, carried the infirm ancient out for an airing on his more juvenile shoulders? What says the old French *quatrain*?

Le Cicogneau, ayant prins sa croissance
Porte et nourrit ses père et mère vieux.
Ainsi chacun d'aider soit envieux
Son père vieil tombé en decadence.

And the parental was equal to the filial piety of these birds. Witness the true story of the devoted mother at the great fire of Delft. The flames raged and crackled on every side: they gained the roof, where the nest with its callow young lay. The distracted parent tried in vain, by every means in her power, to convey her young from the danger, but her most strenuous efforts were unavailing; and then, singed with the fire, and half-suffocated by the smoke, she spread her wings over them, pressed them to her bosom, and perished with them.

So much for what may be termed the good moral qualities of the stork; now let us take a glance at its physical structure.

Mounted on two long bare legs covered with a scaly skin, fit armour against the tooth of Cleopatra's asp, the light body is justly balanced. The toes are webbed to the first joint from the divarication; so that, if in wading it should suddenly get out of its depth, the safety of the bird is provided for. The extensive wings, framed for wafting the animated vessel on its lofty aerial voyage, are worked by powerful muscles; while the head, thrown back by the long neck on the body, lies compact, and the extended legs aid the comparatively short tail in regulating the course of the animated balloon. When on the feed, the neck is either stretched out, or, if the bird be watching for its prey, drawn back upon the shoulders, ready to dart forth the spear-like beak in a moment. Serpents, lizards, fish, and frogs, are its favourite food, and hence the respect in which it is held by all nations, to whom it comes a welcome and regular visitor. Toads it will eat if pressed by hunger, but not for choice, eschewing most probably the acrid exudation which is discharged from the tubercles of that reptile's skin.

He who in the summer glides near the banks of what

was once the silver Thames, sees the tempting bait of 'LIVE FISH,' hung out from many a sign, which too often lies like a bulletin. Now the stork's repast is very frequently a truly animated one, and he not unfrequently feels the inconvenience of a too lively dinner, anxious to escape by one of the doors mentioned by Dr. Last in the course of his examination. 'I know them,' saith the worthy Joannes Faber, 'who have learned by ocular inspection that storks, when such serpents as they swallow passed alive through their bodies (as they will do several times), use to clap their tails against a wall so long till they feel the serpents dead within them.'

Three or four white eggs, with a slight tinge of buff, suboval, some two inches and ten lines in length, and about one inch eleven lines broad, are deposited by the white stork in its ample nest. The parents feed their nestlings after the manner of pigeons, by inserting their own bills within those of their young, and imparting from their own stomach the partly-digested remains of the food which they have last taken.

That the white stork does not scrupulously confine itself to a fish, frog, and serpent diet, those know to their cost who have suffered it to stalk about near the breeding-places where the wild duck hides her nest. The highly moral bird, whose piety is blazoned in books of emblems carrying his revered parent on his shoulders, and held sacred in so many cities (where, doubtless, they keep their weather eyes open upon their juvenile stray poultry), notwithstanding his solemn gait, is a bit of a Pecksniff in his way. After standing stock-still in a musing attitude, as if he were above the vanities of this world, he has been seen to march slowly by the side of the ornamental lake with the air of a contemplative philosopher, and then disappear among the bushes. Before his disappearance, a snug nest, near the point where he vanished, as if to continue his meditations

undisturbed by human eye, has been seen full of goodly little dusky powder puffs of wild ducklings, and somehow or other, when he has emerged from the wilderness, it has been soon after discovered that the nest was empty. This feathered ogre was in the habit of visiting the nests day by day, biding his time till incubation was fully complete, when he swallowed every squab that had come to light. But every living thing eats only to be eaten. As far as humanity is concerned, the white stork appears to have gone out of fashion, and come in again as a savoury dish.

Cornelius Nepos, who died in the daies of Augustus Cæsar Emperor, in that chapter, where he wrote that a little before his time men began to feed and cram blackbirds and thrushes in coupes, saith moreover, that in his daies storks were holden for a better dish at the bourd than cranes. And yet see how in our age now no man will touch a storke if it be set before him upon the bourd; but every one is readie to reach unto the crane, and no dish is in more request.*

Horace, in his bitter second satire,† writes:—

Tutus erat rhombus, tutoque ciconia nido:
Donec vos auctor docuit Prætorius.

And the gay Petronius rattles along the lines, in which we hear the clatter of the bird's beak:—

Ciconia etiam grata, peregrina, hospita,
Pietaticultrix, gracilipes, crotalistria,
Avis exsul hiemis, titulus tepidi temporis,
Nequitix nidum in cacabo fecit meo.‡

Old Belon (anno 1555) quotes the passage from Pliny, with the following comment:—‘Voulant dire que les Grues estoyent en delices, et les Cicognes n'estoyent touchées de personne.’ But he adds, ‘Maintenant les Cicognes sont tenues pour viande royale.’

We do not trace it in our household books. Indeed,

* Holland's Pliny.

† L. 49.

‡ *Satyricon*, c. 55.

the bird never comes to these islands regularly; and but a few instances of its presence here in a free state are recorded, though it is so frequent on the Continent, and much farther north—Russia for example.

In the old Pharmacopœia, which it must be owned contained many a rich prescription, the white stork made a great show. He who ate the flesh, roasted or boiled, might safely go to the wars as far as his nerves and joints were concerned; and it was considered equally potent against the more cruel domestic enemies—gout and sciatica. A diet on the young was equally efficient in disorders of the eyes; and their ashes made an infallible collyrium. To cure paralysis, you had only to catch a young stork, clap its bill under its wing, suffocate it under a pillow, chop it up, put the pieces into an alembic, save the distilled liquor, and after having bathed the disabled limb with a decoction of crabs—without salt, mind you—anoint it with the afore-said essence of stork, and follow this course alternately, when, if the patient was not cured, 'twas a wonder. If you should have some misgivings concerning the efficacy of the nestling, consult Leonellus Faventinus, and he will tell you that an old stork, plucked and simmered in oil, till the flesh separates from the bones, is just as good against the same disease as oil of vipers. Take one ounce of camphor, with a drachm of the best amber, place it in the belly of an exenterated young stork caught before he can fly, distil it, and Andreas Furnerius will assure you that you have an infallible cosmetic, which we venture to state will mend complexions as effectually as the Circassian Bloom, or Rowland's Kalydor. Pliny will convince you that the stomach of the bird was a specific against all poisons, and Belon corroborates him. In short, not to weary you, dear reader, the stork, according to these wise men, was a universal medicine chest.

The bird was looked up to by more than one profession, the gardener looked at its bill, and named one of his most favourite groups of plants *Pelargonium*; the chemist beheld it, and fashioned his retort; and the apothecary took a hint from the practice of the bird about which we care not to be particular, though some will have it that it was the ibis and not the stork which made the suggestion. And here we may observe, that Belon and others are of opinion that our bird is the white ibis of Herodotus (*Euterpe*, 76); but it should be remembered that the moderns as well as the delightful Halicarnassian record, and with truth, a white as well as a dark species of *ibis*; and it is not less true that there is a black as well as a white stork.

The black stork* is the very opposite to the white species, in manners as well as in colour, flying from the haunts of men as eagerly as they are sought by the latter. The food is nearly the same as that of *Ciconia alba*, with, however, a greater leaning towards a fish diet.

Its visits to this country are rare. Colonel Montagu's tame black stork was slightly shot in the wing on Sedgemoor, near the parish of Stoke in Somersetshire, in May, 1814. The bone was not broken, and the bird lived in the colonel's possession in good health for more than a year. Like the white stork, it frequently rested upon one leg; and if alarmed, particularly by the approach of a dog, it made a considerable noise by reiterated snapping of the bill, similar to that species. It soon became docile, and would follow its feeder for a favourite morsel—an eel. When very hungry it crouched, resting the whole length of the legs upon the ground, and seemed to supplicate for food by nodding its head, flapping its wings, and forcibly expelling the air from the lungs with audible

* *Ciconia nigra*.

expirations. Whenever it was approached, the blowing, accompanied by repeated nodding of the head, was provoked. It was of a mild and peaceful disposition, very unlike many of its congeners; for it never used its formidable bill offensively against any of its prisoned companions, and even submitted peaceably to be taken up without much struggle. From the manner in which it was observed to search the grass with its bill, there could be no doubt that reptiles form part of its natural food; and the colonel inferred that even mice, worms, and the larger insects probably, add to its usual repast. When searching in thick grass, or in the mud, for its prey, the bill was kept partly open. 'By this means,' says the colonel, 'I have observed it take eels in a pond with great dexterity: no spear in common use for taking that fish can more effectually receive it between its prongs than the grasp of the stork's open mandibles. A small eel has no chance of escaping when once roused from its lurking-place. But the stork does not gorge its prey instantly like the cormorant; on the contrary, it retires to the margin of the pool, and there disables its prey by shaking and beating it with its bill before it ventures to swallow it. I never observed this bird attempt to swim; but it will wade up to the belly, and occasionally thrust the whole head and neck under water after its prey. It prefers an elevated spot on which to repose; an old ivy-bound weeping willow, that lies prostrate over the pond, is usually resorted to for that purpose. In this quiescent state the neck is much shortened by resting the hinder part of the head on the back, and the bill rests on the fore-part of the neck, over which the feathers flow partly so as to conceal it, making a very singular appearance.'

In this attitude the bird may be seen in the Zoological Garden in the Regent's Park, where one has lived many years, and has stood for his portrait to most of the

ornithological writers of the day. Its likeness illustrates the works of Bennett, Selby, Gould, Meyer, and Yarrell.

Truly Brahminical and reflective is the air of one of these old stagers. Motionless in the attitude above described stands the black philosopher. It is a lovely summer's day, but the sun and the gentle breeze floating the clouds under the blue sky move him not. A slight motion in the eye may be detected as one of the giddy young sparrows with which the Zoological Garden is infested flits by, but he stirs not. At last a luckless new-fledged one passes within reach of our philosopher. Quick as thought the trenchant bill is darted forward, and—crack!—the little bird is seized and swallowed.

Gesner recommends that the bird should be first boiled and then roasted. He describes the flesh as of a reddish tinge like that of a salmon, and to his taste it seemed good and sweet; but he adds that the skin is very tough, and if this were to be taken off there would, probably, be no need of the boiling.

The visitors to the Garden in the Regent's Park will have noticed a queer, uncouth, bald, scabrous-headed feathered form, with an enormous beak, now marching in comic stateliness, at another time standing on one or two stilts of legs with an air of drunken gravity, and again seated with the whole length of legs stretched out and resting upon them, as the black stork is above described to have rested. It is now some sixty years since this odd form was first introduced to the ornithologists of this country. At first it was commonly known by the name of the 'Adjutant,' the title conferred on it in Calcutta. Dr. Latham first described this Bengal adjutant, the argala of the natives, in his general synopsis, as 'the gigantic crane.' But, in truth, there are no less

than three species of these worthies, forming a natural group of gigantic storks, not only cherished, like the white stork, for their services to man, but valued for the beautiful plumes called 'Marabous,' from the Senegal name of the African species. The extreme lightness of these long downy feathers, which are transferred from the sides beneath the wings and from under the tail of the bird to wave over the brow of beauty, where they float with every breath of air, may be conceived from Latham's experiment. He weighed one of them, which was eleven inches and three-quarters in length and seven in breadth, and balanced only eight grains.

Temminck, in his *Planches Coloriées*, has well pointed out the difference between the marabou of Africa, the argala of the Asiatic continent, and the insular species—probably the boorong-cambing or boorong-oolar of Marsden—inhabiting Java and the neighbouring islands. The Javanese bird, separated by Dr. Horsfield, is probably identical with the Sumatran species.

Second only to the vultures in the eagerness with which these feathered scavengers turn the most disgusting substances into nutriment, the adjutants and marabous are safe from all annoyance, and stalk about among the dwellings of man, the privileged abaters of all nuisances. Carrion, flesh and bone, everything, in short, that offends the eye and the nose, enters the omnivorous maw of 'the large throat,' 'the bone-eater,' 'the bone-taker,' as this voracious utilitarian is in some places termed. Snakes, lizards, frogs, and small quadrupeds and birds, have small chance of life when they fall in its way; and as the size of the devourer calls for a vast supply, its consumption of both living and dead things is enormous.

But why should the bird have been called an adjutant?—he looks more like an ancient, methinks.

Very good, sir; but to say nothing of his staid and solemn gait, just behold him afar off. 'I have been told,' says Latham, 'that the bird has obtained this last name of adjutant from its appearing, when looked on in front at a distance, like a man having a white waistcoat and breeches.'

A lofty percher, and a high flier, so as to give a wide sweep to its ken, in order that it may perceive any incumbrance to the land which it may clear away, the bird is gifted with powerful vision, and appliances to assist in keeping it up in the air. It has a cervical or sternal pouch, more or less developed in each of the species, which depends more than a foot in the argala, but much less in the marabou. This, as well as the skin at the back of the head, can be inflated at the will of the bird; and both, doubtless, assist its buoyancy. From its high roost it looks down, like a freebooter from his tower: and thereby hangs a tale.

Almost every living creature may be made a pet; and Smeathman noticed a marabou which had arrived at such preferment. Roosting high upon the cotton-trees, it would sit motionless, till it descried from a great distance the servants bringing the dishes to the dinner-table. Then, spreading its sail-broad vans, down it came, and took its place behind its master's chair. But it was hard to keep such a portentous piece of voracious machinery as its enormous bill idle in the presence of so many good things; and the servants were armed with switches to prevent it from helping itself. Notwithstanding their vigilance, however, a whole boiled fowl would, every now and then, vanish from the dish, and disappear at a single gulp into the capacious crop of the pet.

The jabirus (*Mycteria*), of which there are three species—one in Asia, one in South America, and one in Australia—are closely allied to the family of storks, and,

especially, to the gigantic group which I have attempted to sketch.

I cannot learn that any of the storks kept in the Regent's Park have attempted incubation. The marabou stork, indeed, dawdled about, and made a nest, such as it was, one season, but no egg was laid.

March, 1850.

CHAPTER IV.

AFRICA, of all the quarters of the old world, is the country of wonders. Take up a steady-going book of travels, or the *Arabian Nights*, what region like Africa? Open a volume of natural history, the older the better, and the African marvellous forms throw all the others into shade. Did not the phoenix live there, and make its appearance among the Heliopolitans only once in five hundred years? He came, on the death of his sire, in shape and size like an eagle, with his glorious parti-coloured wings of golden hue set off with red, dutifully bearing from Arabia the body of his father to his burial-place in the temple of the sun, and there piously deposited the paternal corpse in the tomb.

But how did the phoenix carry him to the grave—as the kite carried Cock Robin, I suppose?

No, madam; he brought his revered, deceased parent in this manner. He first formed a large egg of myrrh, and then having by trial ascertained that he could carry it, he hollowed out the artificial egg, put his parent into it, stopped up the hole through which he had introduced the body with more myrrh, so that the weight was the same as the solid egg of myrrh, and performed the funeral in Egypt.*

If you would see the manner of his death, turn to the *Portraits d'Oyseaux, Animaux, Serpens, Herbes, Arbres, Hommes et Femmes d'Arabie et Egypte, observez par P. Belon du Mans*:† and there you will behold 'Le

* Herodotus, *Euterpe*.

† Paris, 1557.

Phoenix selon que le vulgaire a costume de le portraire,' on his fiery funeral pile, gazing at a noon-day radiant sun with as good eyes, nose, and mouth, as ever appeared over mine host's door, with the following choice morsel of poetry:—

O du phoenix la divine excellence !
 Ayant vescu seul sept cens soixante ans,
 Il meurt dessus des ramées d'ancens :
 Et de sa cendre un autre prend naissance.

It is to be hoped, for the sake of the son, that this is the correct version. The carriage of ashes from Arabia to Egypt, wrapped up in myrrh, is a very different task from the portorage of a dead body thence and thither.

Some, again, declare that the bird never died at all; but that when Age 'clawed him in his clutch,' and he found himself not quite so jaunty as in the vaward of his youth, he collected the choicest perfumed woods of Araby the Blest, waited patiently for fire from heaven to kindle the 'spicy' pile, burnt away what we have heard termed 'his old particles,' and came forth as if he had drunk of the renovating elixir of life.

But what right had the phoenix to such pleasant immortality?

Because he never ate the forbidden fruit.

Moreover, there is a place in Arabia, near the city of Buto, to which Herodotus went on hearing of some winged serpents; and when he arrived there, he saw bones and spines of serpents in such quantities as it would be impossible to describe; there they were in heaps, and of all sizes. Now this place is a narrow pass between two mountains, opening into a spacious plain contiguous to that of Egypt; and it is reported, says he of Halicarnassus, that at the commencement of spring, winged serpents fly from Arabia towards Egypt, but the ibises meet them at the pass, and kill them; for

which service the ibis is held in high reverence by the Egyptians.*

The 'serpent ællé' that flew near Mount Sinai, figured by Belon, was probably one of this ghastly crew of invaders.

And here a word for Herodotus, who has been accused of all sorts of Munchausenisms. It will be generally found, that whatever he says he himself saw, has been corroborated by modern eye-witnesses. In the case of the phoenix, he writes—'*They say* that he has the following contrivance, which, in my opinion, is not credible;' and then he relates the story of the egg of myrrh, and of the son's carrying the father's body into Egypt. Again, he *heard* of winged serpents, but says he *saw* the bones of serpents, which he doubtless did; and after describing the black ibis which fights with the serpents, at the conclusion of the chapter he evidently alludes to the *report*, when he says that the form of the serpent is like that of the water-snake, but that he has wings without feathers, and as like as may be to the wings of a bat.

When we take a glance at the map, and see what an enormous area of African territory is still an undiscovered country, even in this age of enterprise, can we wonder that romance has been busy with the vast and unknown tracts? Many of the animals which are known to us are of extraordinary shape and habits; and it was but the other day that Professor Owen described a new species of anthropoid apes, the Gorilla, more horrible in appearance than any phantom that Fuseli ever imagined. Look at the proportions of the giraffe, with its prehensile tongue, and its mode of progression, by moving two legs on the same side together, so that both feet are off the ground at the same time. But we must not multiply examples which will occur to most of our readers.

* *Euterpe*, 74.

A few years only have elapsed since the giraffe has been made familiar to modern Europeans, and in no country have so many been kept together as in the British islands. In the Garden of the Zoological Society they have bred regularly and well, and the offspring, with one exception, have lived and thriven. Still there are three huge African forms which have never yet made their appearance in that extensive and noble vivarium—the African elephant, the hippopotamus, and the African rhinoceros, of which last there are several species. By the enterprise of the society, aided by the prudent zeal of Mr. Mitchell, we may soon have the satisfaction of beholding the two first of these gigantic pachyderms in the Garden at the Regent's Park.

And here we cannot but congratulate those who delight in zoology—and who, now-a-days, does not?—upon the happy change which has passed over that noble and now well-conducted establishment, since Mr. Mitchell, favourably known for his attainments in that branch of science, and gifted with the command of a ready and accurate pencil, has held the office of secretary. A healthy and comfortable air pervades the place. The habits of the animals are studied, and confinement made as little irksome as possible. Communications are opened with foreign powers, and new forms continually flow in, consequent upon a wise liberality.

I am just returned from visiting the greyhounds about to be sent by the Zoological Society to Abbas Pasha, who has already caused one young hippopotamus to be taken from the White Nile. It is now* under the kind care of the Hon. C. A. Murray,† at Cairo, where it safely arrived on the 14th of November last, when it was flou-

* March, 1850.

† Zoologists owe a large debt of gratitude to Mr. Murray, for the unwearied activity, tact, skill, and care, which he has exerted to procure curious living animals for this country.

rishing, enjoying a bath of the temperature of the river, and delighting everybody by its amiable and docile qualities. This most valuable gift was accompanied by a fine lioness and a cheetah; and Mr. Murray was further informed, by his Highness the Viceroy of Egypt, that a party of his troops remained out on the White Nile, expressly charged with the duty of securing a young female hippopotamus, destined also for the Society.

If fortune be but propitious—if no casualty should arise to disappoint our hopes—it is not improbable that in the merry month of May, two hippopotami may be presented to the wondering eyes of the visitors to the Regent's Park. The Romans, who saw in their day every known creature that the Old World produced, were made familiar with this uncouth form—this huge incorporation of life—at their shows and shambles of men and beasts, when both fell slaughtered as the crowning excitement of the arena. But no living hippopotamus has as yet been seen on British ground.

The King of Dahomy, the steps of whose throne are formed of the skulls of his enemies, and who commands an army of plump, well-fed Amazons, had never seen a peacock. The Zoological Society, longing for an *African* elephant, sent over to his majesty a gift of pea-fowl, the cocks having first been shorn of their tail—or rather back-feathers; for the feathers springing from the back arrange themselves into that magnificent iridescent circle, and are supported by the caudal feathers, when Juno's bird shines out in all his splendour, and, as the nursery-maids term it, 'spreads his tail.'

But why dock the peacocks?

Because, if they had been sent with their trains on, they would have presented such a ragged appearance to the royal eyes, after being cooped up on their voyage—to say nothing of the irritation to the system of the

birds themselves from their bedraggled and begrimed plumage, or of the accidents of pitch and tar—that the king might have well questioned the faith of those who had filled his mind with the glories of this recipient of the eyes of Argus, and his blood-drinker might have been called into action. No, the train-feathers were most wisely cut, and, with the birds, a well-executed drawing of a peacock in all its glory was sent, and his majesty was informed, that when they moulted, and the new feathers came to perfection, the effect would be similar to the drawing, but very superior.

With the present, a letter—*grandis epistola*—was sent, bescaled and beribanded, together with a list of the Society from which the present came. His majesty listened in silence while one name well known to scientific Europe after another was pronounced, and the king made no sign; but when that of Lord Palmerston was enunciated, the royal voice interrupted the recitation of the beadroll with, ‘Ah, I know that man!’

Then the peacocks were paraded, and, even in their curtailed state, admired, and the king gave directions to his Amazons to seek out a wild female elephant, with a young one of an age fit to be separated from the mother; and when they had found her, their orders were to kill the hapless parent and to save the offspring as a gift to the Zoological Society of London.

The lamented death of Mr. Duncan, who, take him all in all, was, perhaps, the very man of all others for keeping up our relations with this grim potentate, may possibly act unfavourably for the interests of the Society, but we have so much confidence in the energy of the management, that we doubt not that this misfortune, great as it is, will not be suffered long to cloud the fair prospects which were opened to the longing eyes of naturalists and the sight-seeing public.

Just look at the announcement which the council of

the Zoological Society have been enabled to make for the current year. They state that they have already received advice of collections of various importance, which are in progress of formation, or already shipped from :—

Singapore—by Capt. the Hon. H. Keppel, R.N.

Ceylon—by A. Grant, Esq. M.D., and A. Grace, Esq. Deputy Queen's Advocate.

Bombay—by Alexander Elphinston, Esq., and A. Shaw, Esq. H.E.I.C. Civ. S.

Whydah—by J. Duncan, Esq. H.B.M. Vice-Consul.

Sta. Lucia—by Lieutenant Tyler, R.E.

South Carolina—by J. Davis, Esq. M.D.

As long as the president and council do their duty in this way, and consider the instruction and amusement of thousands, as they have done, by lowering the price of admission on Mondays to sixpence, they will receive the support of the public ; and they deserve it.

Of the African form of rhinoceros, three species—*Rhinoceros bicornis*, *Rhinoceros keitloa*, and *Rhinoceros simus*—are preserved in the well-arranged zoological collection of the British Museum, which owes so much to the energetic care of Mr. Gray ; nor do we despair of seeing some, if not all, of these great pachyderms in life and health in the Regent's Park. Last year the Asiatic rhinoceros (*Rhinoceros Indicus*) died there, after a healthy existence of fifteen years in the Garden. The cause of death, apparently, was inflammation of the lungs,—a disease which, assisted by the damp and foggy atmosphere arising from the undrained clay soil, carries off so many of the animals confined there. When will the Government take in hand the long-promised work of draining that park ? All ye dwellers in that captivating, but—during certain months, when moisture is most prevalent—dangerous locality, read the well-written and well-considered report of Mr. Donaldson. The com-

portable dowagers now take their airings without fear of the dashing, well-mounted highwaymen, who formerly took toll in Marylebone Fields; but malaria still lurks there, shrouded in the mist that rises from the marshy ground and that ornamental but unblessed lake—for no stagnant water resting upon a basin of clay can ever carry healing on the wings of its evaporation.

But to return to the deceased rhinoceros. On dissection it was manifest that the animal had broken a rib, probably in throwing itself heavily down to rest in its uncouth manner. This fracture might have injured the lungs at the moment, and the subsequent ankylosis probably produced a pressure which accelerated the disease. Shortly before death the animal strained to vomit, without effect, with the exception of some froth tinged with blood at the mouth; and soon afterwards bloody matter was discharged at the nose. These are not pleasant particulars; but these lines may meet the eyes of some of those interested in the management of the animals, and may afford hints for the future.

Poor fellow, he was stupidly good-natured in the main, and would let the visitors rub his nose or his horn—which, by the way, he never permitted to grow, but kept it constantly rubbed down—or tickle him about the eye, or place their hands in the folds of his stout mail-like buff coat, where the skin, as we heard an honest yeoman, who was making the experiment, say, was ‘as soft as a lady’s!’ He was very good friends with poor old Jack the elephant, now dead and gone, notwithstanding the stories of the violent antipathy which the two huge beasts bear to each other, and how the rhinoceros runs his horn at last into the elephant’s belly, and how the blood of the elephant runs into the eyes of the rhinoceros and blinds him, when the roc, or ruk, pounces upon the combatants, and carries them both off in his claws. Our elephant used to tickle the

rhinoceros with his trunk, and stroke the long ears of his playmate right handily, now and then giving his friend's tail a sly pull; upon which the rhinoceros would cut a clumsy caper, wheel round, and nibble the elephant's trunk with his huge flexible lips. He was fond of going into the capacious tank, which served as a bath for him and the elephant, who were alternately let out into the enclosure; the gambols before-mentioned having been played through the iron railing, when the elephant was expatiating in the great enclosure, and the rhinoceros was out in the small space before its apartment.

When the rhinoceros first took to the water, there was a marked difference between his obstinate stupidity and the sagacity of the elephant, under the same circumstances. The bottom of the tank, which is surmounted by an elevated coping, gradually inclines from the entrance, till, at the opposite extremity, it is deep enough to permit an elephant of full height, and of the massive proportions of poor Jack, to submerge the whole of its gigantic body; and most gratifying it was to see Jack enjoy the cooling comforts of an entire submersion, now dipping his huge head beneath the surface, and presently raising it again, again to plunge it out of sight. The rhinoceros walked in well enough down the gradual descent, and when he got out of his depth swam boldly to the opposite extremity. Once there, however, he seemed to have no idea of the possibility of returning, but remained plunging and making fruitless efforts to get out over the raised coping while he was in the deep water, where the wall went sheer down and there was no foothold. It was rather a nervous time for those who witnessed the violent and ungainly efforts of the brute; for it was feared that he would then and there tire himself out, and sink exhausted. At last, when almost overworn by his useless toil, he

was half-forced, half-coaxed round, and when his head was turned towards the entrance, he swam thither till he found footing, and then walked out.

His muscular power was prodigious. The iron railing of the enclosure was strengthened by great iron spurs at regular distances. He would insert the anterior part of his enormous head between the spur and the upright, and then give powerful lateral wrenches till he fairly prized it off. Once he got out, and, without doing further mischief, terminated his ramblings with a *pas seul* in a bed of scarlet geraniums: the condition of the *parterre* after the performance may be imagined. He was then secured, and led back to his place of confinement.

There was a tortoise-like look about him that was very striking. The curiously-formed upper lip, the testudinous look of his thick armour-like skin, his legs and feet, all favoured the notion of a huge warm-blooded creature made after the pattern of the cold-blooded *testudinata*, with improvements. For he was active in his way, and when excited his rush was terrific. The noise of the roller, when the gardeners were rolling the gravel-walk that flanks the place where he was suffered to go at large, had the most exciting effect upon him. He would be standing perfectly still at the further end of the enclosure, and the moment he heard the noise of the roller in motion, round he would turn, and rush down towards it in a rampant state, till he was brought up by the strong iron railing, which those who saw these paroxysms began to think must go down like reeds before him.

If we have no immediate prospect of beholding the living forms of the African species of this genus, we have a very fair chance of soon seeing the two other pachyderms mentioned above; and a slight sketch of their habits and history may not come amiss to those who are

not merely content with sight-seeing, but like to know something about what they see.

To begin, then, with the African elephant—*Elephas Africanus*. Notwithstanding the accounts which we read relative to the enormous stature of this species in the narratives of travellers who have come suddenly upon them, the better opinion is that it is smaller than the Asiatic elephant. The principal differences are visible in the head, ears, and nails of the feet. The contour of the head is round, and the forehead is convex instead of concave: the ears are considerably longer than those of its Asiatic congener, and on each hind foot the African elephant has only three nails, while the Asiatic has four.

The following dimensions of a male elephant, which was killed near Bru, some ten miles from Kouka, are given by Major Denham, who arrived at the place where the huge quarry lay just as the elephant, which was not more than twenty-five years old, had breathed his last:—

	ft.	in.
Length from the proboscis to the tail	25	6
Proboscis	7	6
Small teeth	2	10
Foot longitudinally	1	7
Eye	0	2 by 1½
From the foot to the hip-bone	9	6
From the hip-bone to the back	3	0
Ear	2	2' by 2 6

But he says that he had seen much larger elephants than this alive; some, he adds, he should have *guessed* to be sixteen feet in height, and with tusks probably exceeding six feet in length. Major Denham, however, acknowledges that the elephant whose measurement is above given, which was the first he had seen dead, was considered of more than common bulk and stature.

This unfortunate animal was brought to the ground by

hamstringing, and was eventually despatched by repeated wounds in the abdomen and proboscis: five leaden balls had struck him about the haunches in the course of the chase, but they had merely penetrated a few inches into his flesh, and appeared to give him but little uneasiness. The whole of the next day the road leading to the spot where he lay was like a fair, from the numbers who repaired thither for the sake of bringing off a part of the flesh, which, Major Denham observes, is esteemed by all, and even eaten in secret by the first people about the sheikh. 'It looks coarse,' adds the major, 'but is better flavoured than any beef I found in the country.' Upon this occasion whole families put themselves in motion to partake of the spoil.

The manner of hunting the elephant (says Major Denham) is simply this:—From ten to twenty horsemen single out one of these ponderous animals, and, separating him from the flock by screaming and hallooing, force him to fly with all his speed; after wounding him under the tail, if they can there place a spear, the animal becomes enraged. One horseman then rides in front, whom he pursues with earnestness and fury, regardless of those who press on his rear, notwithstanding the wounds they inflict on him. He is seldom drawn from this first object of pursuit; and at last, wearied and transfixed with spears, his blood deluging the ground, he breathes his last under the knife of some more venturesome hunter than the rest, who buries his dagger in the vulnerable part near the abdomen: for this purpose he will creep between the animal's hinder legs, and apparently expose himself to the greatest danger: when this cannot be accomplished, one or two will hamstring him while he is baited in the front; and this giant of quadrupeds then becomes comparatively an easy prey to his persecutors.

In one of his hunting expeditions while at Kouka, Major Denham was shooting wild-fowl, when one of the sheikh's people came galloping up with the information that three very huge elephants were grazing close to the water. When he and his party came within a few hundred yards of them, all the persons on foot, and Major Denham's servant on a mule, were ordered to halt, while

the major and three others rode up ' to these stupendous animals.'

The sheikh's people began screeching violently; and although the beasts at first appeared to treat the approach of the cavalcade with great contempt; yet, after a little, they moved off, erecting their ears, which had till then hung flat on their shoulders, giving a roar that shook the ground under the horsemen.

One (says the major) was an immense fellow, I should suppose sixteen feet high; the other two were females, and moved away rather quickly, while the male kept in the rear, as if to guard their retreat. We wheeled swiftly round him; and Maramy (a guide sent by the sheikh), casting a spear at him, which struck him just under the tail, and seemed to give him about as much pain as when we prick our finger with a pin, the huge beast threw up his proboscis in the air with a loud roar, and from it cast such a volume of sand, that, unprepared as I was for such an event, nearly blinded me. The elephant rarely, if ever, attacks; and it is only when irritated that he is dangerous; but he will sometimes rush upon a man and horse, after choking them with dust, and destroy them in an instant.

Cut off from his companions, the elephant took the direction leading to where the mule and the footmen had been left. They quickly fled in all directions; and the man who rode the mule, which was not inclined to increase its pace, was so alarmed that he did not get the better of the fright for the whole day. The major and his companions pressed the elephant very close, riding before, behind, and on each side of him; and his look sometimes, as he turned his head, had the effect of checking instantly the speed of the major's horse. His pace never exceeded a clumsy rolling walk, but was sufficient to keep the horses at a short gallop. Major Denham fired a ball from each barrel of his gun at the beast, and the second, which struck his ear, seemed to give him a moment's uneasiness only. The first, which struck him on the body, failed in making the least impression; and,

after giving him another spear, which flew harmless off his tough hide, he was left to pursue his way.

Eight elephants were soon afterwards reported as being at no great distance, and coming towards the party; and they all mounted for the purpose of chasing away the beasts, which appeared to be unwilling to go, and did not even turn their backs till the horsemen were quite close, and had thrown several spears at them. The flashes from the pan of the gun seemed to alarm them more than anything; but they retreated very majestically, first throwing out, like the elephant first encountered, a quantity of sand. On their backs were a number of birds called *tuda* (a species of *buphaga*, probably), described as resembling a thrush in shape and note, and represented as being extremely useful to the elephant, in picking off the vermin from those parts which it is not in his power to reach.

In his excursion to Munga and the Gambarou, Major Denham and his party came, just before sunset, upon a herd of fourteen or fifteen elephants. These the negroes made to dance and frisk like so many goats by beating a brass basin with a stick; and in the neighbourhood of Bornou these animals were so numerous as to be seen near the Tchad in herds of from fifty to four hundred.

In temper the African elephant is considered to be more ferocious than the Asiatic, which may be one reason that it is not now tamed. But it is clear that the Carthaginians availed themselves of its services in war; and it can hardly be doubted that the elephants which Cæsar and Pompey exhibited in the amphitheatre came from Africa.

The tusks of this species are of grand dimensions, and form a lucrative branch of trade. The ivory of them being as much prized in modern times as it was by the ancients for furniture, ornamental purposes, and, above all, for the chryselephantine statues, such as those of the

Minerva of the Parthenon, and of the Olympian Jupiter, in the creation of whose forms Phidias surpassed himself.

Regard being had to the ears, the shape of the African species appears to have been that chosen by Belial,

A fairer person lost not heav'n,

in which to present himself to Faust :

Le gouverneur et principal maître du Docteur Fauste, vint vers le dit Docteur Fauste, et le voulut visiter. Le Docteur Fauste n'eut pas un petit de peur, pour le frayer qu'il lui fit ; car en la saison qui étoit de l'été, il vint un air si froid du diable, que le Docteur Fauste pensa être tout gelé.

Le diable, qui s'appelloit *Belial*, dit au Docteur Fauste : Depuis le Septentrion, où vous demeurez, j'ai vû ta pensée, et est telle, que volontiers tu pourvois voir quelqu'un des esprits infernaux, qui sont princes, pourtant j'ai voulu m'apparoître à toi, avec mes principaux conseillers et serviteurs, à ce que vous aussi aiez ton désir accompli d'une telle valeur. Le Docteur Fauste répond : Orsus, où sont ils ?

Mark the courage of Faust under the influence of this Sarsar, this 'icy wind of death.' The devil was conscious that the great magician quailed not.

Or *Belial* étoit apparu au Docteur Fauste en la forme d'un éléphant, marqueté, et aiant l'épine du dos noire, seulement ses oreilles lui pendoient en bas, et ses yeux tous remplis de feu, avec de grandes dents blanches comme neige, une longue trompe, qui avoit trois aunes de longueur demesurée, et avoit au col trois serpens volans.

Ainsi vindrent au Docteur Fauste les esprits, l'un après l'autre, dans son poisle : car ils n'eussent peu être tous à la fois.

Or *Belial* les montra au D. Fauste l'un après l'autre, comment ils étoient, et comment ils s'appelloient. Ils vinrent devant lui les sept esprits principaux, à sçavoir ; le premier, *Lucifer*, le Maître Gouverneur du Docteur Fauste, lequel se décrit ainsi. C'étoit un grand homme, et étoit chevelu, et picoté, de la couleur comme des glandes de chêne rouges, qui avoient une grande queue après eux.

And so that damned spirit passed by.

Après venoit *Belzebub*, qui avoit les cheveux peints de couleurs, velu par tout le corps ; il avoit une tête de bœuf avec deux oreilles

effroiables, aussi tout marqueté de hampes, et chevelu, avec deux gros floquets si rudes comme les charains du foulon qui font dans les champs, demi verd et jaune, qui flottoient sur les floquets d'en bas, qui étoient comme d'un four tout de feu. Il avoit un queue de dragon.

This apparition seems to have suggested that which so terribly disturbed poor old Trunnion; but the next evil spirit is at Faust's study door:—

Astaroth; celui-ci vint en la forme d'un serpent et alloit sur la queue tout droit: il n'avoit point de pieds, sa queue avoit des couleurs comme de bliqués changeantes, son ventre étoit fort gros, il avoit deux petits pieds fort courts, tout jaunes, et le ventre un peu blanc et jaunâtre; le col tout de chastein roux, et une pointe un façon de piques et traits, comme le Hérisson, qui avançoient de la longueur des doigts.

No naturalist could have given a more precise description of this devilish Pict.

Après vint *Satan*, tout blanc et gris, et marqueté; il avoit la tête d'une asne, et avoit la queue comme d'un chat, et les cornes des pieds longues d'une aune!

And so he vanished.

Suivit aussi *Anubry*. Il avoit la tête d'un chien noir et blanc, et des mouchetures blanches sur le noir, et sur le blanc des noires; seulement il avoit les pieds et les oreilles pendantes comme un chien, qui étoient longues de quatre aunes.

This must have been the 'dog of Nile, Anubis.'

Après tous ceux-ci venoient *Dythican*, qui étoit d'une aune de long, mais il avoit seulement le corps d'un oiseau, qui est la perdrix: il avoit seulement tout le col verd et moucheté ou ombragé.

Were it not for the green neck and the bizarre quality of the plumage, we have here the very familiar that tripped along at the feet of Charles V. Titian has immortalized both.*

* In his full-length portrait of the emperor, with a tame partridge at his feet,

Le dernier fut *Drac*, avec quatre pieds *fort courts*, jaune et verd, le corps par-dessus flambant brun, comme du feu bleu, et sa queue rougeâtre.

This last grovelling spirit must have been the red-tape devil of the party.

Ces sept avec *Belial*, qui sont ces conseillers d'entretien, étoient ainsi habillez de couleurs et façons, qui ont été recitées.

Then came a rabble of fiends, some in the shapes of unknown creatures; others less ambitious, taking the forms of frogs, fallow deer, red deer, bears, wolves, apes, hares, buffaloes, horses, goats, boar-pigs, and the like: but are they not pictured in the fearful nightmare of Walpurgis night by the hand of Retszch, under the inspiration of Goethe?

We must lay down this fascinating old book,* even though we shut it in the face of our reader, albeit the indomitable Faust, no whit abashed, bids his friend 'go on;' and stands undaunted the infernal battle wherein all these diabolical forms eat each other up, after changing to as many shapes as the Princess in the Arabian story, without even leaving their tails, to say nothing of the plague of insects which afterwards comes upon him and drives him almost mad; till bitten, stung, and blistered all over by the vilest vermin, he leaves the enchanted atmosphere of Belial and his study—not beaten, mind you—and coming forth into the blessed air of nature, finds that it is all a diabolical delusion, and that his skin is unsullied by a single insect, parasitic or predatory.

When Faust has Mephistopheles, thereafter, assigned to him, what adventures! But we must not be tempted further, though Alexander the Great himself is made to appear to the emperor, Charles V., as vividly as the

* Histoire prodigieuse et lamentable de JEAN FAUST, Grand Magicien, avec son testament, et sa vie épouvantable. A Cologne, chez les Héritiers de Pierre Marteau.

phantoms to the *Deformed transformed*, upon the adjuration of the Stranger to the

Demons heroic—
 Demons who wore
 The form of the Stoic
 Or Sophist of yore—
 Or the shape of each victor
 From Macedon's boy.

We must leave the magic land of apparitions for the realities of nature, and introduce such of our readers as feel inclined to the introduction, to the other pachydermatous form, which we hope soon to behold alive in the flesh, the *ἵππος ποτάμιος* of the Greeks.

What an uncouth form it is, propped upon four short huge legs, looking like a gigantic wine-skin fit for the revels of Polyphemus!

'*The Hippopotamus*'—are there not more than one species?

That there are several fossil species* there is no doubt; but whether more than one species now exists is a vexed question.

M. Desmoulins names two—*Hippopotamus Capensis*, and *H. Senegalensis*—resting his distinction, as he says, on osteological discrepancies as strong as those on which Cuvier depended, when he separated the great fossil hippopotamus from the recent species existing at the Cape. Nay, M. Desmoulins goes farther, not only expressing an opinion that it is not impossible that the hippopotamus of the Nile differs from the two above mentioned, but hinting that there may be two species in that river. The difference of colour observed by M. Caillaud, who found among forty *hippopotami* living in the Upper Nile two or three of a bluish-black hue, while the rest were reddish, seems to be the foundation on which M. Desmoulins built his last-named suggestion.

* *Hippopotami major, minutus, medius*, for example.

But colour is often a treacherous guide when specific character is the question; and to say nothing of differences due to sex and age, the alteration of colour in the same individual when its skin is dry, when it is moist, and when the river-horse is taking his subaqueous walk, has been remarked by more than one observer. Le Vaillant, for instance, watched the progress of one at the bottom of Great River, from the top of an elevated rock, which advanced into the stream, and he remarked that its colour—which is grayish, he says, when the animal is dry, and bluish when the skin is only moist—as it walked along under the water, appeared to be of a deep blue. After the French traveller had satisfied his curiosity by looking over this unconscious peripatetic, as a certain personage, not to be named to ears polite, is said to look over Lincoln, he watched the moment when it came to the surface to breathe, and killed it with a well-directed bullet, to the great joy of his Hottentots, who, in their surprise at the feat, and delight at the size of the beast, called it, ‘The grandmother of the river.’

In its osteological organization, the hippopotamus approaches in some degree that of the ox and the hog. The skull, especially, exhibits much similarity in the connexion of its bones, and the figures of its sutures, to that of the *Suidæ*; but, at the same time, it bears the impress of its own peculiarity.

The teeth are very remarkable, and, especially the molars, vary much in form, number, and position, according to the growth and age of the animal. The long subcylindrical incisors, and the canines—the latter being enormous tusks terminating in a sharpened edge, which reminds the observer of that of a chisel—of the lower jaw, give a terrific aspect to the mouth when it is open. This tremendous apparatus, formed principally for tearing and bruising more than grinding, is a fit crushing mill

for the coarse, tough plants which are transmitted to a stomach capable of containing, in a full-grown hippopotamus, five or six bushels, and a large intestine some eight inches in diameter. Three bushels, at least, of half-masticated vegetables have been taken from the stomach and intestines of one half-grown. But it is impossible to look upon these fearful teeth without thinking of defensive and offensive weapons, fit to correct, or even attack a crocodile, if it should venture to take liberties, or approach too near, in its plated armour. It is on record that, when irritated or exasperated by wounds, the bite of the hippopotamus has sunk a boat. Nor would we rely so much upon its abstinence from animal food (though we do not give implicit credit to the lamentable statement in Alexander's letter to Aristotle, that the hippopotami, rushing from the depths of the river, devoured the light troops which he had sent to swim across), as to feel quite certain that if such luckless wanderers were to come in its way when it was hungry, it would not give a zest to its salads with a tender young crocodile or two. Major Denham states that the flesh of the crocodile is extremely fine, that it has firm green fat resembling the turtle, and that the callipee has the colour, firmness, and flavour of the finest veal. Mr. Bullock gave me the same account of the flesh of the alligator, as far as the similitude to veal goes. I presume both travellers were speaking of young saurians; for the patriarchs give out a very strong musky smell.

The formidable teeth of the hippopotamus are masked, when the animal is not excited, by immense lips, and the body is wrapped in a coating of fat, which, in its turn, is shielded by a thick, smooth, tough hide—of which more anon.

The longest of the two hippopotami measured by Zerenghi was sixteen feet nine inches in length, its

girth was fifteen feet, its height six feet and a half, the aperture of the mouth two feet four in width, and the tusks above a foot long, clear of the sockets.

About the same period is required to complete the gestation of the hippopotamus as that necessary for the production of man : at least, so it is said, and probably with truth. The female calves on land ; and both mother and offspring take to the water on the slightest alarm. This renders the capture of the young exceedingly difficult. An eye-witness assured Thunberg that he watched a female hippopotamus which had gone up from a neighbouring river, and lay motionless with his company till the calf was brought forth, when one of the party shot the poor mother dead. Up sprang the Hottentots from their hidden lair, and rushed forward to secure the new-born creature ; but its instinct did more for it than their reason for them—it gained the bank, threw itself into the bosom of the friendly river, and escaped.

Another calf, surprised by Sparrman's party, was not so fortunate. On the 28th January, 1766, after sunrise, just as he and his Hottentots were thinking of leaving their posts for their waggons, a female hippopotamus, with her calf, came from some other pit or river, to take up their quarters in that which Sparrman was then blockading. While she was waiting at a rather steep part of the river's bank, and looking after her calf, which was lame, and consequently came on but slowly, she received an ill-directed shot from a Hottentot rejoicing in the name of 'Flip'—whom Sparrman, in his wrath, designates as the drowsiest of all sublunary beings, declaring he was half asleep when he fired—and immediately plunged into the river. One of the Hottentots then seized the calf, and held it by its hind legs till the rest of the party came to his aid ; when it was fast bound and borne in triumph to the waggons,

making a noise much like a hog that is going to be killed, but more shrill and harsh. It struggled hard, and was very unmanageable; and, though the Hottentots were of opinion that it was not more than a fortnight, or at most three weeks old, it was three feet and a half in length, and two feet high. When it was let loose it ceased crying; and after the Hottentots had passed their hands several times over its nose, in order to accustom it to their effluvia, it directly began to take to them; and in its hunger, poor thing, devoured the droppings of the oxen. While it was alive, Sparrman made a drawing of it, from which the plate in *The Swedish Transactions* for 1778, and that in his own *Voyage*, was taken; and then the hapless orphan was killed, dissected and eaten, in less than three hours. Sparrman found four stomachs—the first nearly empty, containing only a few lumps of cheese or curd; in the second were several clots of caseous matter, and a great quantity of sand and mud; the third contained lumps of caseous matter of a yellow colour, and harder consistence than the others, together with several leaves, quite whole and fresh, and some dirt; in the fourth was a good deal of dirt, with a small quantity of curds, which were whiter than those in any of the other stomachs. The intestinal canal was 109 feet long.

This, be it remembered, was a baby. What a supply must be requisite for the full-grown animal!

Bitterly does the husbandman, whose cultivated fields lie in the neighbourhood of a hippopotamus-haunted river, rue its voracity, and describe it, unconsciously, in terms long ago recorded by Nicander* and Diodorus,†

* "Ἡ ἵππου τὸν Νεῖλος ὑπὲρ Σαῖν αἰθαλοέσσαν
Βοσκει, ἀρουρησιν δὲ κακὴν ἐπιβάλλεται ἄρπην.—*Theriac.*

† Diodorus says, that if the fecundity of the beast were greater, it would be ruinous to the agriculture of Egypt; and Sonnini

expressive of the ruin occasioned to his crops by these enormous reapers. They were regarded as the symbol of the destruction-dealing Typhon, and were worshipped, as some nations worship the devil, from the terror which they inspired. In modern times, every settler and every native makes war upon them. Pit-falls, ambushes, the rifle, are ready for them wherever they make their appearance; to say nothing of the old and somewhat apocryphal story of laying lots of dried peas in their way—rather an expensive proceeding one should think—which these gluttonous giants devour, and then drinking copiously the peas swell within them till they burst. The beast had his revenge sometimes; and Sparrman was in such a parlous fear, when one came out of the stream upon his party, with a hideous cry, and ‘as swift as an arrow from a bow,’ that he thought the river had overflowed its banks, and that he should be drowned. After this confession, he thus endeavours to account for the strange impression:—‘As the hippopotamus,’ says he, ‘when it is newly come up out of the water, and is wet and slimy, is said to glisten in the moonshine like a fish, it is no wonder that as soon as I took my handkerchief from before my eyes, it should appear to me, at so near a view as I had of it, like a column of water, which seemed to threaten to carry us off and drown us in a moment.’

The voice of the animal is described as something between grunting and neighing; the words *hëurh*, *hurh*, *heoh-heoh*, are used by Sparrman to give some idea of its cry; the two first words being uttered in a hoarse, but sharp and tremulous sound, resembling the grunting of other animals, while the third or compound word is

states, in the same spirit, that these animals devastated whole tracts of country, and were as formidable enemies to man as the crocodile.

sounded extremely quick, and is not unlike the neighing of a horse. Others describe the sound as more resembling the bellowing of a buffalo than the neighing of a horse—at least, just before death. Some call it snorting, some neighing, and others again grunting; and it has been likened to the deep creaking of a very heavy gate or door on its hinges.

Neither of these similes conveys the idea of anything very melodious, but there can be no doubt that this clumsy creature has some music in his soul.

Major Denham relates, that during the excursion to Munga and the Gambarou the party encamped on the borders of a lake frequented by hippopotami, and intended to shoot some of the huge inmates. A violent thunder-storm prevented their sport; but next morning they had a full opportunity of convincing themselves that these uncouth animals are not only not insensible to musical sounds, but strongly attracted to them, as seals are said to be, even though the music should not possess the softness and sweetness of the Lydian measure. As the major and his suite passed along the borders of the Lake Mugaby at sunrise, the hippopotami followed the drums of the different chiefs the whole length of the water, sometimes approaching so close to the shore that the water they spouted from their mouths reached the persons who were passing along the banks. Major Denham counted fifteen at one time sporting on the surface; and his servant Columbus shot one of them in the head, when he gave so loud a roar as he buried himself in the lake that all the others disappeared in an instant.

But whatever may be thought of the snortings and neighings of this *See-pferd*, all agree that it deserves the more appetizing name of *Wasser ochs*, when the sapid excellence of its flesh is considered. The *Sea-cow's speck*, in other words, the layer of fat which lies immediately below the skin, salted and dried, is highly prized by the

Cape Town epicure. Of the teeth, Odoardus Barbosa justly saith, 'Hanno gli ippopotami i denti, come gli elefante piccoli et e migliore avorio di quello de gli elefanti, e più bianco, e più forte, e di maniera che non perde il colore.' For this last reason the ivory of the canine teeth is highly valued by the manufacturers of those pearly rows which the artist knows so well how to form when he makes the beautiful dental series of rosy eighteen appear between the withered lips of eighty. Nor were the ancients ignorant of its value in a somewhat higher branch of art. Pausanias relates that the face of Cybele was formed of the teeth of these animals.

The tough skin in ancient times was fashioned into helmets and bucklers. 'The skin or hide of his backe is unpenetrable (whereof are made targuets and head-pieces of doubtty proof that no weapon wil pierce), unlesse it be soked in water or some liquor,' saith the worthy Philemon Holland, in his translation of Pliny. It is, in these modern days, made into whips, and with these instruments terrible punishments, not unfrequently fatal, like the Russian knout, are inflicted.

Major Denham makes one shudder when he describes the execution of one of those wickedly hypocritical judgments, which, affecting to avoid a sentence of death, inflicts it in one of its most agonizing forms.

Oppressively hot as the weather was, the sheikh, he states, admitted of no excuse for breaking the Rhamadan, and any man who was caught suffering his thirst to get the better of him in an African June, or visiting his wives between sunrise and sunset, was sentenced to 400 stripes with one of these deadly whips.

A wretched woman bore two hundred stripes—the number to which she was sentenced—within the courtyard of the palace, and was afterwards carried home senseless.

Her paramour received his punishment in the dender

or square, suspended by a cloth round his middle—his only covering—and supported by eight men. An immense whip of one thick thong cut from the skin of the hippopotamus was first shown to him, which he was obliged to kiss and acknowledge the justice of his sentence. The fatáh was then said aloud, and two powerful slaves of the sheikh inflicted four hundred stripes, relieving each other every thirty or forty strokes. ‘They strike,’ says the major, ‘on the back, while the end of the whip, which has a knob or head, winds round and falls on the breast or upper stomach: this it is that renders these punishments fatal. After the first two hundred ——’ here the dreadful details become too horrible. ‘* * * In a few hours after he had taken the whole four hundred he was a corpse. The agas, kashellas, and kadis attend on these occasions. I was assured the man did not breathe a sigh audibly. Another punishment succeeded this, which, *as it was for a minor offence—namely, stealing ten camels and selling them*—was trifling, as they only gave him one hundred stripes, and with a far less terrific weapon.’

In ancient history the hippopotamus figures under many shapes; some giving it the mane of a horse and the hoofs of an ox, and others the tail of the last-named animal. Whether it be the behemoth of Job* is doubtful, many asserting that it is, and as many thinking that it is not: among the last Milton must be reckoned,—

Scarce from his mold,
Behemoth biggest born of earth upheav'd
His vastness; fleec'd the flocks and bleating rose,
As plants: ambiguous between sea and land
The river horse and scaly crocodile.†

It is remarkable that the accounts of the ancients, from Herodotus and Aristotle down to Pliny and subse-

* Chap. xl. 10-19.

† *Paradise Lost*, vii. 470.

quent writers, should be so extremely inaccurate, while the representations which have come down to us are comparatively correct. Take, for example, the coin of Hadrian, with a crocodile at the side of Nilus and a hippopotamus looking up at the river god ; the coin of Marcia Otacilla Severa ; and the sculpture on the plinth of the statue of the Nile, with a crocodile or scink—probably the former—in its mouth.

Besides, one should think that some had seen the animal itself. ‘ Marcus Scaurus was the first man, who in his plaies and games that he set out in his ædileship, made a show of one water-Horse and foure Crocodiles swimming in a poole or mote made for the time during those solemnities.’* One, also, swelled the triumphal pomp of Augustus after his victory over Cleopatra. The later emperors exhibited them frequently, and there is every reason for concluding that they were shown, no longer as mere objects of curiosity, but matched with men. The bestiarius must have thought he had an ugly customer when the lanista first introduced a hippopotamus to him as the antagonist against which he was pitted. The third Gordian gratified the people with the display of thirty-two elephants, ten elks, ten tigers, sixty tame lions, thirty tame leopards, ten hyænas, a thousand pair of gladiators, one hippopotamus, one rhinoceros; and ten cameleopards. These gigantic ‘games’ as they were called, had almost always a bloody termination ; and the gifted author of *The Last Days of Pompeii* caught the spirit of the savage populace when he made one of them shout in joyous anticipation,—

Ho ! ho ! for the merry merry show,
With a forest of faces in every row ;
Lo ! the swordsmen bold as the son of Alcmena
Sweep side by side o’er the hush’d arena.

* Holland’s Pliny.

Talk while you may, you will hold your breath
When they meet in the grasp of the glowing death !
Tramp ! tramp ! how gaily they go !
Ho ! ho ! for the merry merry show !

The ancients believed that great enmity existed between the hippopotamus and the crocodile ; and that they bear no very good will to each other may be very possible ; but near neighbours as they are, dangerous enough perhaps, Nature has so provided for them, offensively and defensively, that they, most probably, maintain an armed neutrality.

The hippopotamus did not escape the medical practitioners of old. Pliny and others show how it enriched the pharmacopœia. We spare our readers the various prescriptions, merely observing, that the teeth were famous against the toothache, and that the mother who could procure some of the brain had only to rub the gums of her infant with it to deliver the poor dear baby from the torments of teething. We must not omit that the animal was considered a master of the art of healing, from his alleged habit of letting blood by pressing the vein of his leg against a sharp stake, or stout, broken, sharp-pointed reed, when his constitution required it.

If we are so fortunate as to overcome the difficulties of rearing and of the passage, and lodge the young hippopotamus, now sojourning in Egypt, safely in the Regent's Park, how different will the spirit of the British people who will crowd to see it be from that with which the sanguinary Romans, high and low, beheld the same form ! We shall have the privilege of peaceably enjoying the sight of this peaceable animal, anxious, in its uncouth way, to show its good will to those who show good will to it, instead of lusting for the terrible excitement of the amphitheatre.

Commodus, on one occasion, exhibited five ; and descending into the arena butchered some of these wretched

beasts with his own imperial hand. Queen Victoria, accompanied by her consort and their children, the hopes of Britain, will graciously look upon the unmolested creature.

April, 1850.

CHAPTER V.

JOHN JONSTON, quoting Robertus de Monte, remarks, that 'in the year 1125 the winter was so violent, that innumerable eels in Brabant, by reason of the ice, went forth of the lake, which is strange, and got into hay-ricks, and lay hid there, till by extream cold they rotted away. And the trees at last had scarce any leaves put forth in May.' The eels might as well have staid patiently in their lake waiting for better times, as we must for milder weather. Whether the May of 1850 is to be like the May in 1125, is a problem yet to be solved; but I write on the 28th March, after a bitter easterly-wind-blowing month of it, with the snow on the ground, the sun shining, and the searching, biting, blasting wind in the old quarter. There was thick ice yesterday on the water in St. James's Park. The dryness, for weeks, has almost equalled that which afflicted Italy in the 322nd year after the building of Rome, and we have had dust more than enough to ransom a heptarchy of kings. So pressed for food were the blackbirds, in consequence of the drought, that they ate off the grass of the pinks and carnations, making them look as if that plant-cutting bird the *Phytotoma*,* or the rodent rabbit,

* *Phytotoma rara*. The Chilian Plant-cutter. It lives on plants, which it cuts off close to the root, and often shears off many more than it wants, leaving them on the ground, as if it did the mischief from caprice. The peasants consequently employ every method in their power for its destruction, and rewards are given to children who take their eggs. Molina describes the bird as about the size of a quail, with a rather large bill, half an inch in length, conical, straight, a little pointed, and serrated.

had been at them. The crocuses look pinched with cold, and keep their petals closed, though the sun's rays court them, as if in mockery, to expand. But if Phœbus bears the nuptial torch of the diurnal flowers, without the aid of Zephyrus, the loves of the plants are checked. The buds bide their time snugly wrapped up in their varnished coats; but still nature gives signs of vegetable life. The 'daffodils begin to peer,'—daffodils

That come before the swallow dares, and take
The winds of March with beauty;

and the primrose and violet brave the severity of the season from their lowly but sheltered retreats. After all, the time has been genial when compared with the springs of 1771 and 1838, though the impatience with which many of us regard that fixture, the weathercock, day after day, can hardly be wondered at. But could we order things for the better in the long run?

A distinguished philosopher and poet,* indeed, remarks, that the suddenness of the change of the wind from north-east to south-west seems to show that it depends on some minute chemical cause, which, if it was discovered, might probably, like other chemical causes, be governed by human agency, such as blowing up rocks by gunpowder, or extracting the lightning from the clouds. If, adds the Doctor, this could be accomplished, it would be the most happy discovery that ever has happened to these northern latitudes, since in this country the north-east winds bring frost, and the south-west winds are attended with warmth and moisture; and he argues, that if the inferior currents of air could be kept perpetually from the south-west supplied by new productions of air at the line, which he makes the *officina ævis* for this supply, or by superior currents flowing in a contrary direction, the vegetation in this country would

* Darwin.

be doubled, as in the moist African valleys which know no frost; the numbers of its inhabitants would be increased, and their lives prolonged; for a great abundance of the aged infirm of mankind, as well as many birds and animals, are destroyed by severe continued frosts in this climate.

And thus man proposes. See what he would do if he had the direction of the clerk of the weather-office! Our poetic philosopher, however, omits to tell us how he would dispose of the superfluous population of long-livers in this Eden, or how the tropical temperature would suit hyperborean constitutions. In such a paradise, threescore would be no burden, and all the gay grandsires would frisk as in the celebrated Herefordshire May dance, in which figured eight chosen men, 'whose ages counted together made eight hundred yeers compleat, so that what one wanted of a hundred, the other exceeded a hundred as much.' Our noble ladies would emulate 'the Countesse of Desmond, who lived in the yeer 1589, and after: she married in the dayes of Edward the fourth; Verulam saith, she thrice renewed her teeth, and lived a hundred and fourty yeers.' *

All this looks charming upon paper, but, depend upon it, the winds are best in the hand of the Great Anemo-

* Jonston, 1657: who adds, 'Epimenides of Crete lived 150 yeers; Gorgias Siculus, a rhetorician, 108; Hippocrates, 114; Terentia, wife of Cicero, 103; Clodia, daughter of Ofilius, 115, though when she was young she had borne fifteen children. What shall I say of Luceia or Galeria Copiola? She lived not a little more than a hundred yeers; for it is reported that for a hundred yeers she played the jester upon the stage: it may be, at first she acted the maid's part, and at last an old wive's. Isra, the player and dancer, was in her youthfull dayes brought upon the stage: how old she was then is not known, but after 99 yeers from that time she was again brought upon the Theater, not to act her part, but to be showed as a miracle; when Pompey the Great dedicated the Theatre. Also she was again shewed at the sports

narch and disposer of events, who in His own good time will send the desired change.

Still, shivering mortals may be pardoned for looking with intense anxiety for the winged herald of summer, whose advent ever has been and ever will be hailed by man. A Greek design is now before me, representing three persons of different ages. The one on the left, a young man in the flower of youth, exclaims, as he points to the bird flying above him, 'Behold a swallow!' The centre figure, a man of more advanced but still vigorous age, seated, like the former, has just turned his up-lifted head, saying—'True, by Hercules!' and at the same moment a boy, standing and pointing to the welcome apparition, cries 'There she is.' All this the eldest personage ratifies with 'The spring is come!' Nearly the same exclamations flow through a line of Aristophanes.*

Speaking of the American barn swallow,† Wilson says, 'We welcome their first appearance with delight, as the faithful harbingers and companions of flowery spring and ruddy summer; and when, after a long frost-bound and boisterous winter, we hear it announced that 'the swallows are come,' what a train of charming ideas are associated with the simple tidings.' The human heart was

ordained for to pray for the health of Divus Augustus. Verstigan writes, that at Segovia, in Spain, it was reported that a woman lived a hundred and sixty years. Franciscus Alvarez reports, that he saw an Archbishop of Æthiopia a hundred and fifty years old. Buchanan testifies that one Laurentius, of the Orcades, when he was a hundred and forty years old, went a fishing in his boat in the coldest winter commonly.' All these, however, with our own old Parr to boot, must hide their diminished youthful heads before John Jonston's other example, which we have reserved for the last. 'John of Times, that was armour-bearer to Charles the Great, lived 360 years!!'

* Σκέψασθε παῖδες, κ. τ. λ.—*Equites*.

† *Hirundo rufa*, Gm.; *Hirundo Americana*, Wilson.

equally touched, whether it was beating in the bosom of an ancient Greek or of a modern American.

The length of the American bird is seven inches, and its alar extent thirteen. The bill is black; the upper part of the head, neck, back, rump, and tail coverts steel blue, the colour descending roundly on the breast. The forehead and chin are deep chesnut, and the lining of the wing, belly, and vent, light chesnut. The wings and tail are of a brown or sooty black, glossed with reflections of green. Tail deeply forked, the two external feathers being an inch and a half longer than those next to them, and tapering towards their ends: each feather, with the exception of the two middle ones, are marked on the inner vane with an oblong white spot. The eyes are dark hazel, the sides of the mouth of a yellow hue, and the legs dark purple. Such is the plumage of the male.

The female differs from her mate in having the under parts of a rufous white slightly clouded with a rufous hue, and her external tail feathers are shorter than those of the male.

They are nearly a week in finishing their nest, which they commence early in May. Wilson describes it as being in the form of an inverted cone, with a perpendicular section cut off on that side by which it adheres to the wood. At the top it has an extension of the edge, a sort of offset, for the male or female to sit on occasionally: the upper diameter is about six inches by five, the height externally seven inches. Mud mixed with fine hay, as plasterers mix their mortar with hair to make it adhere the better, and wearing the appearance of having been placed in regular strata or layers from side to side, forms the shell, which is about an inch in thickness. The interior of the cone is filled with fine hay well stuffed in, and above the hay lies a handful of very large downy goose feathers. On this soft receptacle repose five eggs, white, specked and spotted all over with reddish brown. A

slight flesh-coloured tinge is due to the semi-transparency of the egg-shell.

On the 16th of May, being on a shooting expedition on the top of Pocano Mountain, Northampton, when the ice on that and on several successive mornings was more than a quarter of an inch thick, Wilson observed with surprise a pair of these swallows which had taken up their abode on a miserable cabin there. It was then about sunrise, the ground white with hoar-frost, and the male was twittering on the roof by the side of his mate with great sprightliness.* The man of the house told him that a single pair came regularly there every season, and built their nest on a projecting beam under the eaves, about six or seven feet from the ground. At the bottom of the mountain, in a large barn belonging to the tavern there, Wilson counted twenty nests, all seemingly occupied. In the woods, he says, they are never met with; but as you approach a farm they soon catch the eye, cutting their gambols in the air. Scarcely a barn to which these birds can find access is without them; and as public feeling is universally in their favour, they are seldom or never disturbed. The proprietor of the large barn above-mentioned, a German, assured Wilson, that if a man permitted the swallows to be shot, his cows would give bloody milk, and also that no barn where swallows frequented would ever be struck with lightning: —‘I nodded assent,’ adds this charming and amiable writer: ‘when the tenets of superstition lean to the side of humanity, one can readily respect them.’

* Our swallow is equally matutinal; and our own Gray has truly and pathetically associated it with the other early rural sounds:—

The breezy call of incense-breathing morn,
The swallow twittering from the straw-built shed,
The cock's shrill clarion or the echoing horn,
No more shall rouse them from their lowly bed.

Our Transatlantic brethren have also *their* 'chimney swallow,'* described with his usual felicity by Wilson, who remarks that the noise which the old ones make in passing up and down the funnel has some resemblance to distant thunder. When heavy and long-continued rains prevail, the nest loses its hold: if this disaster occurs during the period of incubation, the eggs are of course destroyed when the loosened nest is precipitated to the bottom. But kind Nature has provided for the safety of the brood if the misfortune happens before they can well fly; for the muscular power of the feet and the sharpness of the claws of the nestlings, even when they are blind—and a considerable time elapses before they can see—are remarkable, and the houseless young frequently scramble up the sides of the vent, to which they cling like squirrels, and are often fed by the parents for a week or more while so situated.

Mr. Churchman, a correspondent of Wilson, counted more than two hundred go in of an evening into one chimney of a mansion. Once he saw a cat come upon the house, and place herself near the chimney, where she strove to catch the birds as they entered, but without success. Puss then climbed to the chimney-top, and there took her station. The birds, nothing daunted, descended in gyrations without seeming to regard her, though she made frequent attempts to grab them. 'I was pleased,' adds good Mr. Churchman, 'to see that they all escaped her fangs.' Wilson, who was a close observer, says that he never knew these birds resort to kitchen chimneys where fire was kept in summer. He thought he had noticed them enter such chimneys for the purpose of exploring, but he observed also that they immediately ascended, and went off, on finding fire and smoke.

* *Hirundo pelagica*, Linn.

Then there is the 'purple martin,'* — a general favourite with the Anglo-Americans, and even with the Indians. Boxes are placed for the welcome birds in the homesteads, and in these comfortable lodgings four spotless white eggs, very small for the size of the bird, are deposited.

He well repays the hospitality.

The purple martin (says the author last quoted), like his half-cousin the king-bird, is the terror of crows, hawks, and eagles; these he attacks whenever they make their appearance, and with such vigour and rapidity that they instantly have recourse to flight. So well known is this to the lesser birds and to the domestic poultry, that as soon as they hear the martin's voice engaged in fight, all is alarm and consternation. To observe with what spirit and audacity this bird dives and sweeps upon and around the hawk or eagle is astonishing; he also bestows an occasional bastinado on the king-bird when he finds him too near his premises, though he will at any time instantly co-operate with him in attacking the common enemy.

Byron, who then rarely, if ever, tasted meat, sitting one day opposite to Moore, who was discussing a beef-steak with hearty good will, inquired whether the diet did not make him savage? The stimulating food of the pugnacious purple martin differs from all the rest of the American swallows; wasps and beetles, particularly those called by the boys, 'Goldsmiths,' are his favourite prey. Wilson took four of these large beetles from the stomach of one of these birds.

But we must leave the other American *Hirundinidæ*, though the temptation be strong; for it is impossible not to be struck with the migration which is at this moment in progress all over the world. For example, we have it on undoubted authority that from the twenty-first day of March to the first of May, at least one hundred million of birds enter Pennsylvania from the south,—part on their

* *Hirundo purpurea*, Linn.; *Progne purpurea*, Boie.

way further north, and part to reside during the season. Wilson ascertained during his residence with Mr. Bartram, in the summer of 1811, that in the Botanic Garden and the adjoining buildings, comprehending an extent of little more than eight acres, not less than fifty-one pairs of birds took up their abode and built their nests.

Return we then to our own happy land, and our own swallows.

Ælian and Plutarch declare that the fly and the swallow are the only animals which cannot be tamed. Pliny gives the swallow two other 'indocible' companions, in his forty-fifth chapter setting forth 'what birds are not apt to learne, and will not be taught.'

And now (says the Roman zoologist, speaking through the mouth of the venerable Philemon Holland),—and now that we are in this discourse of wit and capacitie, I must not omit to note that of birds the swallow, and of land beasts the mouse and the rat, are very untoward, and cannot be brought to learn; whereas we see great elephants ready to do whatever they are commanded; the furious lions brought to draw under the yoke; the seals within the sea, and so many fishes grow to be tame and gentle.

Whether, as time has rolled on, swallows have become more civilised and docile, or man has arrived at greater excellence in the art of domesticating and taming animals, are questions which are not for discussion here; but certain it is that swallows become very familiar in confinement, and to the observations made in this state we owe the knowledge that their moult takes place in January and February, for they have been so kept for many months.

In September, 1800, the Rev. Walter Trevelyan wrote from Long-Witton, Northumberland, in a letter to the editor of Bewick's *British Birds*, the following narrative, which is so simply and beautifully written, and gives so clear an account of the process of taming, that it would be unjust to recite it in any words but his own for the

edification of those who may wish to make the experiment:—

About nine weeks ago (writes the good clergyman), a swallow fell down one of our chimneys, nearly fledged, and was able to fly in two or three days. The children desired they might try to rear him, to which I agreed, fearing the old ones would desert him; and as he was not the least shy they succeeded without any difficulty, for he opened his mouth for flies as fast as they could supply them, and was regularly fed to a whistle. In a few days, perhaps a week, they used to take him into the fields with them, and as each child found a fly and whistled, the little bird flew for his prey from one to another; at other times he would fly round about them in the air, but always descended at the first call, in spite of the constant endeavours of the wild swallows to seduce him away: for which purpose several of them at once would fly about him in all directions, striving to drive him away when they saw him about to settle on one of the children's hands, extended with the food. He would very often alight on the children, uncalled, when they were walking several fields distant from home.

What a charming sketch of innocence and benevolence, heightened by the anxiety of the pet's relations to win him away from beings whom they must have looked upon as so many young ogres! The poor flies, it is true, darken the picture a little; but to proceed with the narrative:—

Our little inmate was never made a prisoner by being put into a cage, but always ranged about the room at large wherever the children were, and they never went out of doors without taking him with them. Sometimes he would sit on their hands or heads and catch flies for himself, which he soon did with great dexterity. At length, finding it take up too much of their time to supply him with food enough to satisfy his appetite (for I have no doubt he ate from seven hundred to a thousand flies a-day), they used to turn him out of the house, shutting the window to prevent his return for two or three hours together, in hopes he would learn to cater for himself, which he soon did; but still was no less tame, always answering their call, and coming in at the window to them (of his own accord) frequently every day, and always roosting in their room, which he has regularly done from the first till within a week or ten days past. He constantly roosted on one of the

children's heads till their bed-time; nor was he disturbed by the child moving about, or even walking, but would remain perfectly quiet with his head under his wing, till he was put away for the night in some warm corner, for he liked much warmth.

The kind and considerate attempt to alienate the attached bird from its little friends had its effect.

It is now four days (writes worthy Mr. Trevelyan, in conclusion) since he came in to roost in the house, and though he did not then show any symptoms of shyness, yet he is evidently becoming less tame, as the whistle will not now bring him to the hand; nor does he visit us as formerly, but he always acknowledges it when within hearing by a chirp, and by flying near. Nothing could exceed his tameness for about six weeks; and I have no doubt it would have continued the same had we not left him to himself as much as we could, fearing he would be so perfectly domesticated that he would be left behind at the time of migration, and of course be starved in the winter from cold and hunger.

And so ends this agreeable story: not, however, that it was 'of course' that the confiding bird would be starved if it remained; for the Rev. W. F. Cornish, of Totness, kept two tame swallows, one for a year and a half, and the other for two years, as he informed Mr. Yarrell.

Wilson has proved that the American barn-swallow may be easily tamed, and he observes that they, too, soon become exceedingly gentle and familiar. He frequently kept them in his room for several days at a time, when they employed themselves in catching flies, picking them from his clothes and hair, and calling out occasionally as they observed some of their old companions passing the windows.

But, after all, it is very questionable kindness to make a pet of a creature so essentially volatile. Look at the bird. Observe its tiny legs and feet. See how the whole structure is fitted for an aerial existence. Look at the prodigal development of wing, and the powerful muscles destined to work the alar machinery,

enabling the bird to sustain itself for hours in the air, and there execute such rapid and changing turns and evolutions as the desultory movements of its insect prey require, and with a celerity that the eye can hardly follow. Virgil found no better simile for the velocity and dexterity exhibited by Juturna, when driving her brother's chariot, to save him from falling into the hands of Æneas; nor Ariosto for the rapidity of the ship wherein Orlando Furioso desired to cleave the waters.

The multitudes of insects destroyed by a pair of swallows in the breeding season, may be imagined from the number of flies that went to make up the daily rations of Mr. Trevelyan's tame bird. Theocritus, through whose verse Nature breathes, had evidently observed the multitudinous visits and departures from the nest for the purpose of feeding the young, and alludes to them with his wonted felicity in his fourteenth idyl. Fable, too, was busy with the bird; and the lamentable story of the daughters of Pandion was celebrated, both in prose and poetry.

Pendebant pennis, quarum petit altera silvas
Altera tecta subit.*

The concluding frightful scene, which reminds one of the horrible revenge of Titus Andronicus, with the additional *coup de théâtre* of Philomela throwing the head of Itylus on the table at the conclusion of the revolting repast, and the subsequent change of Tereus into a hoopoe, Itylus into a pheasant, Philomela into a nightingale, and her sister into a swallow,—

Manibus Procne pectus signata cruentis,†

* Ovid, *Metam.* 6.

† *Georg.* iv. Ovid also takes advantage of the plumage to help the fable:—

Nec adhuc de pectore cædis
Excessere notæ, signataque sanguine pluma est.

is perhaps as striking a chapter of metamorphoses as Greek or Roman ever invented. Moschus makes the two plaintive sisters prominent in their lamentations, when

All the birds in the air fell to sighing and sobbing

on the death of Bion.* Nor are some of the stories told of the bird, evidently in good faith, unamusing,—

In the mouth of Nilus, near Heraclea, in Ægypt, there is a mighty banke or causey raised only of a continuall ranke and course of swallows' nests, piled one upon and by another thicke, for the length almost of half a quarter of a mile; which is so firme and strong, that being opposed against the inundations of Nilus, it is able to breake the force of that river when it swelleth, and is it selfe inexpugnable: a piece of work that no man is able to turne his hand unto. In the same Ægypt, neere unto the towne Coptos, there is an island consecrated unto the goddessse Isis, which every yere these swallows do rampier and fortifie, for feare lest the same Nilus should eat the banks thereof, and break over into it. In the beginning of the spring, for three nights together, they bring to the cape of that Island straw, chaffe, and such-like stuffe, to strengthen the front thereof: and for the time, they ply their businesse so hard, that for certaine it is knowne, many of them have died with taking such paines and moiling about this worke. And verily every yere they go as daily to this taske againe, as the spring is sure to come about; and they faile not, no more than souldiers that by virtue of their militarie oath and obligation go forth to service and warfare.†

Talk of the dykes of Holland after this!

Such services to the Egyptians, and to Isis in particular, deserved a reward, and accordingly Pliny and Ælian will tell you that if the eyes of a swallow are taken out, new ones will come, and the bird see as well as ever. This power of reproduction undoubtedly exists in some of the reptiles, the newt for instance, but not in the higher warm-blooded animals. Aristotle, however, declares, that if the eyes of the swallow's nestlings are

* Ἐπιταφίος Βιῶνος.

† Holland's Pliny.

pricked, they will heal, and leave the young birds with the power of vision. This is far from impossible, especially when the creature is very young, for the humour may be restored under the healed cornea—but pray, gentle reader, do not try the experiment—and is probably the only authority on which Pliny and Ælian founded their radical assertion; but a story always gains something as it goes. ‘It is commonly said, that if a man pluck the eies out of yong serpents, or yong swallows, they wil have new again in their place.’*

Then again, when the *blattæ*, which seem to have been as pernicious to the eggs and nestlings of the swallow as they were to the bees,† persecuted a swallow’s nest, the parents, in the good old times, dashed down to the first parsley bed they could find, plucked some of the leaves, and dropped them into their domicile, when away scuttled the intrusive insects, and not a *blattæ* dared again to show his antennæ there as long as the crisp vegetable kept guard.

Now, really——!

Inquire of Ælian; put him on your desk for cross-examination, and see if you can shake his evidence.

But if the foregoing story of the parsley startles you—and how do you know that parsley will not drive away *blattæ*?—pray listen to the numerous ills which could be cured by means of these hygeian creatures. Take the ashes of the young—but of the bank martin remember—and you have ‘a singular and soveraigne remedy for the deadly squinancy.’‡ Eat them whole, and defy quartan agues; or if you find it unpleasant to go the whole bird, masticate their hearts with honey, or take one drachm of their droppings in goats’ or sheep’s milk before the

* Holland’s Pliny. Pliny’s words are,—‘Serpentium catulis, et hirundinum pullis, si quis eruat, renasci tradunt.’

† *Georg.* iv.

‡ Holland’s Pliny.

quartan access. If your memory should become a little the worse for wear, their hearts, well mingled with cinnamon and ammomum, will soon brighten you up again. You will find water of swallows taken fasting, especially if it be followed by a persevering diet on their flesh, with their ashes mingled in the drink of the patient, as infallible a remedy for epilepsy as any of the nostrums of the present day. Weakness of sight, ophthalmia, inflamed tonsils, are a few only of the maladies which vanished before preparations of the bird. The nests were held excellent good for angina, and their blood for the gout. Then there are certain small stones—you will see them, curious reader, figured in the *Metallotlieca Vaticana Michaelis Mercati*,*—found in the nestlings on dissection, which cured liver-complaints if suspended from the right arm, while those found in the nests with the young rendered the wearer safe from coughs. With regard to the toilet:—he who wishes to forestal the advance of age, which most men eschew, may come out with a venerable white head, and the *ci-devant jeune homme* with a jet black one, if he will only attend to the prescriptions of Galen and Marcellus Kiranides, and mingle the somewhat unsavoury ingredients which they recommend with different parts and secretions of the swallow. If you find you don't succeed, you must settle your accounts with the authors above named—Pliny, Celsus, Jacobus Olivarius, Hieronymus Montuus, and other learned physicians, now, as the old covenanters used to say, 'gone to their place.'

But, seriously, whatever may be thought of the copious *materia medica* which a swallow was supposed to carry about with him in the olden time, there can be little or no doubt that the *lapilli*, or little stones mentioned by Galen and others, were actually found in the young birds,

* Folio. Romæ, MDCCXIX. p. 183.

or in their nests, otherwise we should not have them figured in such a work as the *Metallotheca Vaticana*. Their presence may be thus accounted for. As a help to the digestion of their insect food, the old swallows are said to give their young ones occasional doses of sand and grit; these cohering, may be formed into the stones alluded to, and may be either *cast*,—for Mr. Trevelyan observed that the swallow *casts* after the fashion of an hawk or owl—voided, or found in the bodies of the young on dissection.

This looks very like a dissertation on swallows, and any one who may take up these leaves may feel inclined to ‘put them down,’ under the terror of the many species that remain to be noticed; but no: interesting as is their history, but one other form of swallow, if swallow it may be called, shall here appear.

The wood-swallow,*—the *Be-wowen* of the aborigines of the lowland and mountain district of Western Australia, and the *Worle* of those of King George’s Sound—bids fair to become as great a favourite with the inhabitants of that fifth quarter of the globe, destined probably to be the seat of a great empire hereafter, as the true swallow is with Europeans. Few birds have been more bandied about by systematic ornithologists. Latham made it a thrush, Cuvier an *Ocypterus*, and Wagler a *Leptopteryx*. The Australian colonists appear to have been as near the mark as any of the learned, when they gave it the name which it still bears among them, though they may not have hit the bull’s eye.

* *Artamus sordidus*. There are several species of *Artami*, of which the bird under consideration appears to be the most extensively distributed. ‘No other species of the Australian *Artami* with which I am acquainted,’ writes Mr. Gould, in his elegant and accurate *Birds of Australia*, ‘possesses so wide a range from east to west; the whole of the southern portion of the continent, as well as the island of Van Diemen’s Land, being alike favoured with its presence.’

Mr. Gould describes it as a bird of pleasing actions, often taking up its abode and incubating near the houses, particularly such as are surrounded by paddocks and open pasture-lands, skirted by large trees. It was in such situations as these in Van Diemen's Land that this enterprising traveller and excellent ornithologist first observed it at the commencement of spring. The species was there very numerous on all the cleared estates on the north side of the Derwent, about eight or ten being seen on a single tree, and half as many crowding against each other on the same dead branch, but never in such numbers as to deserve the appellation of flocks. Each bird appeared to act independently of the other, each, as the desire for food prompted it, sallying forth from the branch to capture a passing insect, or to soar round the tree and return again to the same spot. This habit appears to me to indicate some relationship to the fly-catchers. But to return to Mr. Gould, who goes on to state, that on alighting it repeatedly throws up and closes one wing at a time, and spreads the tail obliquely prior to settling. Sometimes he saw a few perched on the fence surrounding the paddock, on which they frequently descended like starlings, in search of coleopterous and other insects. It is not, however, he adds, in this state of comparative quiescence that this graceful bird is seen to the greatest advantage, neither is it that kind of existence for which its form is especially adapted; for although its structure, according to Mr. Gould, is more equally suited for terrestrial, arboreal, and aerial habits, than that of any other species which he had examined, the form of its wing, he observes, at once points out the air as its peculiar province.

Hence it is (remarks Mr. Gould, in continuation) that when engaged in pursuit of the insects, which the serene and warm weather has enticed from their lurking-places among the foliage to sport in higher regions, this beautiful species in these aerial flights displays its greatest beauty while soaring above in a variety of easy positions, with white-tipped tail widely spread.

But another extraordinary habit—which, however, Mr. Gould did not himself observe—is represented in one of the exquisite plates which illustrate the grand work from which we have been quoting.

Mr. Gilbert, Mr. Gould's assistant, gave him the following information, the result of what Mr. Gilbert saw at Swan River :—

The greatest peculiarity in the habits of this bird is its manner of suspending itself in perfect clusters, like a swarm of bees ; a few birds suspending themselves on the under side of a dead branch, while others of the flock attach themselves one to the other in such numbers, that they have been observed nearly of the size of a bushel measure.

This habit of clustering shows itself in the European swallow. Sir Charles Wager relates, that in the spring of the year, as he came into soundings in our channel, a great flock of swallows came and settled on all his rigging : every rope, he says, was crowded. 'They hung on one another like a swarm of bees ; the decks and carving were filled with them. They seemed almost famished and spent, and were only feathers and bones ; but being recruited with a night's rest, took their flight in the morning.'

These weary travellers were evidently on their way northward, and must have passed over France.

Mr. Gould found the Australian wood-swallow very numerous in the town of Perth, until about the middle of April, and then he missed it suddenly, and did not observe it again until near the end of May, when he saw it in countless numbers flying in company with the common swallows and martins over a lake about ten miles north of the town,—so numerous, indeed, that he describes them as darkening the water as they flew over it. Its voice, he says, greatly resembles that of the common swallow in character, but it is much more harsh. He describes the stomach as muscular and capacious, and the food as consisting of insects generally.

In Van Diemen's Land it may, Mr. Gould adds, be regarded as strictly migratory. It arrives there, according to his observation, in October, the beginning of the Australian summer, and, after rearing at least two broods, departs again northwards in November. A scattered few remain throughout the year on the continent in all the localities favourable to their habits, the number being regulated by the supply of insect food. He remarks, that specimens from the Swan River, South Australia, and New South Wales, present no difference, either in size or colouring, while those from Van Diemen's Land are invariably larger in all their admeasurements, and are also of a deeper colour.

The general season of incubation is from September to December, and the situation of the nest much varied. Mr. Gould saw one in a thickly-foliaged bush near the ground; others, in a naked fork, on the side of the bole of a tree, in a niche formed by a portion of the bark having been separated from the trunk, &c. The nest itself he describes as rather shallow, of a rounded form, about five inches in diameter, and composed of fine twigs, neatly lined with fibrous roots. He observed that the nests found in Van Diemen's Land were larger, more compact, and more neatly formed, than those on the continent of Australia; and one which was shown to him by Mr. Justice Montague, near Hobart Town, was placed at the extremity of a small leafy branch. The nest figured by Mr. Gould is so represented.

By the way, Mr. Yarrell gives, in his highly-interesting *British Birds*, a vignette executed from a drawing by Mr. Edward Cooke for the late Mr. Wells of Redleaf. It represents a nest of our common swallow built on the bough of a sycamore, which hung low over a pond at the Moat, Penshurst, in Kent, in the summer of 1832.

Mr. Gould describes the eggs of *Artamus sordidus*, which are four in number, as differing much in the dis-

position of their markings, of a dull white ground colour, spotted and dashed with dark umber brown ; in some, he says, a second series of greyish spots appear, as if beneath the surface of the shell : medium length eleven lines, and breadth eight.

The head, neck, and the whole of the body of the bird are of a sooty grey ; the wings, dark-bluish black ; the external edges of the second, third, and fourth primaries, white. The tail is black, with a tinge of blue, and all its feathers, except the two middle ones, have extensive white tips. The irides are dark brown, and the blue bill has a black tip. The feet are lead colour : sexes alike in colour, the female rather the smaller : length, nearly six inches. Mr. Gould remarks, that the young have an irregular stripe of dirty white down the centre of each feather of the upper surface, and are mottled with the same on the under surface.

April 1.—Yesterday the weathercocks, which had so long been fixtures, veered round,—

Gratâ vice veris et Favoni.

Every bud is now bursting, every seed is swelling now. All Nature is prolific, reminding us of the great egg of Night that floated in chaos, and was broken by the horns of the celestial bull. From this egg* sprang up like a blossom, Eros, the lovely, the desirable, with his glossy, golden pinions,†—Eros, the elder Cupid, the personification of divine love.

All sublunary eggs, in which the principle of life

* The *πρῶτον ὠόν*, the first great egg or seed of the ancient philosophy. A serpent was coiled round it, emblematical of the eternal divine wisdom. Its image was worshipped in the temple of the Dioscuri, Helen's brothers, as a representation, probably, of Leda's production. The breaking of the egg by the horns of the bull is typical of the genial effect of spring.

† Aristophanes, *Aves*, l. 694. Bekker.

glows, are now advancing; and the remembrance of a promise to relate the attempt of the poor incarcerated white-headed eagles to incubate rises.

The female white-headed eagle (*Haliaëtus leucocephalus*) laid her first egg on the 5th of April, 1845, and a second on the 8th of the same month, on a rough nest, composed of litter and twigs, &c., on the floor of her apartment in the eagle-hut at the Garden in the Regent's Park.

What a prison for a bird whose home is on the rock that shoots up from the lake, or the cliffs which overhang the mighty river or the wide sea! Niagara is a favourite resort of the white-headed, or bald eagle,—the latter appellation a misnomer, for no bird has a better feathered head. There it sits or soars on the watch for the fish, and also for the carcasses of squirrels, deer, bears, and other quadrupeds, which, in their attempts to cross the river above the falls, have been caught by the current and dashed down those awful cataracts.

It is a very powerful bird, three feet long, and seven in alar extent; and has been seen flying off with a lamb ten days old: but it let the prey fall from a height of ten or twelve feet, in consequence of its struggles and the shouts of the spectator, who ran with loud halloos after the depredator; the poor lamb's back, however, was broken by the crushing swoop. Nay, a white-headed eagle has been known to seize and throw down an infant, and drag it for a short distance, when the cries of the mother, who had set down the little innocent to amuse itself while she weeded her garden, and the giving way of the child's dress, a portion of which the eagle bore off, saved its life. Thus was a second scene of the 'Bird and Bantling' happily cut short.

It will also attack old and sickly sheep, aiming furiously at their eyes.

In short, he is a most determined brigand, whose por-

trait has been admirably painted by Wilson. Look on this picture :—

Elevated on the high dead limb of some gigantic tree, that commands a wide view of the neighbouring shore and ocean, he seems calmly to contemplate the motions of the various feathered tribes that pursue their busy avocations below ;—the snow-white gulls slowly winnowing the air ; the busy tringæ coursing along the sands ; trains of ducks streaming over the surface ; silent and watchful cranes intent and wading ; clamorous crows, and all the winged multitudes that subsist by the bounty of this vast liquid magazine of Nature. High over all these hovers one whose action instantly arrests all his attention. By his wide curvature of wing and sudden suspension in the air he knows him to be the fish-hawk, settling over some devoted victim of the deep. His eye kindles at the sight, and balancing himself, with half-opened wings on the branch, he watches the result. Down, rapid as an arrow from heaven, descends the distant object of his attention, the roar of its wings reaching the ear as it disappears in the deep, making the surges foam around. At this moment the eager looks of the eagle are all ardour, and levelling his neck for flight, he sees the fish-hawk once more emerge struggling with his prey, and mounting in the air with screams of exultation. These are the signal for our hero, who, launching into the air, instantly gives chase, soon gains on the fish-hawk ; each exerts his utmost to mount above the other, displaying in these rencontres the most elegant and sublime aerial evolutions. The unencumbered eagle rapidly advances, and is just on the point of reaching his opponent, when, with a sudden scream, probably of despair and honest execration, the latter drops his fish. The eagle, poising himself for a moment, as if to take a more certain aim, descends like a whirlwind, snatches it in his grasp ere it reaches the water, and bears his ill-gotten booty silently away to the woods.

This is very beautiful and very poetical, and, what is more, very true. But there are two sides to a question, as there were to the shield about which the two silly knights fought. Turn we now to honest, homely Benjamin Franklin's view of the case.

In his letter to Mrs. Bache, dated Passy, January 26, 1784, he observes, that the gentleman who made his voyage to France to provide the ribands and medals had executed his commission :—

To me (says that venerable philosopher and sturdy Republican) they seem tolerably done ; but all such things are criticized. Some find fault with the Latin, as wanting classical elegance and correctness ; and since our nine universities were not able to furnish better Latin, it was a pity, they say, that the mottoes had not been in English. Others object to the title, as not properly assumable by any but General Washington and a few others who served without pay. Others object to the bald eagle, as looking like a *dindon*, or turkey.

For my own part, I wish the bald eagle had not been chosen as the representative of our country : he is a bird of bad moral character ; he does not get his living honestly. You may have seen him perched on some dead tree, where, too lazy to fish for himself, he watches the labour of the fishing-hawk ; and when that diligent bird has at length taken a fish, and is bearing it to his nest for the support of his mate and young ones, the bald eagle pursues him and takes it from him. With all this injustice he is never in good case, but like those among men who live by sharping and robbing, he is generally poor, and often very lousy. Besides, he is a rank coward : the little king-bird, not bigger than a sparrow, attacks him boldly, and drives him out of the district. He is, therefore, by no means a proper emblem for the brave and honest Cincinnati of America, who have driven all the *king*-birds from our country, though exactly fit for that order of knights which the French call *Chevaliers d'Industrie*. I am, on this account, not displeased that the figure is not known as a bald eagle, but looks more like a turkey. For, in truth, the turkey is, in comparison, a much more respectable bird, and withal a true original native of America. Eagles have been found in all countries, but the turkey was peculiar to ours ; the first of the species seen in Europe being brought to France by the Jesuits from Canada, and served up at the wedding-table of Charles IX.

He is besides (though a little vain and silly, 'tis true, but not the worse emblem for that), a bird of courage, and would not hesitate to attack a grenadier of the British Guards, who should presume to invade his farm-yard with a *red* coat on.

The editor of this interesting correspondence remarks that a learned friend had observed to him, that the assertion about the first turkey being brought to France, &c., is a mistake, as turkeys were found in great plenty by Cortes when he invaded and conquered Mexico, before the time of Charles IX., and that this, and their

being brought to old Spain, is mentioned by Peter Martyr of Angelina, who was secretary to the council of the Indies, established immediately after the discovery of America, and personally acquainted with Columbus.

But, after all, the white-headed eagle is a bold fellow; and Mr. Gardiner relates, that when riding within five or six rods of one, the bird, by raising his feathers and his general defying demeanour, seemed willing to dispute the ground with its owner.

As for the vultures, the eagle treats them as so much dirt; and, indeed, they are little better. He has been frequently seen to keep them at a respectful distance—especially upon one occasion, when a whole colony of hapless squirrels had been hurried down the falls of Niagara—till he had completely satiated himself with the harvest of death; but, when pressed by hunger, he plays the same game with a well-filled vulture as he does, ordinarily, with the fish-hawk, attacking it furiously, making the cowardly glutton disgorge the carrion with which its craw is crammed, and then snatching up the dainty contents.

The nest in a state of nature is generally fixed on some large, lofty tree, often in a swamp or morass; and, if the tree be a favourite, will there be continued for years in succession. From being thus repaired and added to every season, it becomes a dark prominent mass, catching the eye at a considerable distance. To form it, sticks, sods, earthy rubbish, hay, moss, &c., are collected. The eggs are two in number, and Wilson mentions a story about the female laying a single egg first, and, after having sat on it for some time, laying another. When the first is hatched, the warmth of that, they say, hatches the second. Upon the correctness of this tale Wilson declines to determine; but he relates, that a very respectable gentleman in Virginia assured him that he saw a large tree cut down, containing the nest of a bald eagle,

wherein were two young, one of which appeared nearly three times as large as the other. One of these nestlings might have had the lion's share of the food brought by the parents; but the story of the hatching at long intervals is so contrary to all known rules of incubation, that it must be received with the greatest doubt.

We must leave the grand native solitudes where this eagle constructs his eyry for the cabined, cribbed, confined cell, where our poor prisoners did their best to obey nature's law.

The female began to sit on her eggs on the 8th of April, and the pair were seen by hundreds steadily persevering, notwithstanding the gaze of the visitors, from day to day, in a close incubation till the 6th of June, when the worthless eggs were removed. The male was very attentive to the female, and both took their regular turns in sitting. Their entire want of success seems, however, to have disgusted them with the whole proceeding, for we cannot learn that the female has produced an egg since.

The attachment of the parents to the young, though it does not seem to reach the self-devotion of the stork, to which I have in a former chapter alluded, is very great. A person near Norfolk, U. S., informed Wilson, that in clearing a piece of woods on his ground they met with a large dead pine-tree, on which was a nest of one of these birds containing young. Fire was set to the tree, the crackling flames ascended, the tree was in a blaze more than half-way up; the wretched parent darted round and round through the fire until her plumage was so much injured that it was with difficulty she made her escape, and, even in that condition, she several times attempted to return, all the mother rising in her, and driving her to attempt the relief of her doomed nestlings.

In a dissection by Dr. Samuel Smith, of Philadelphia, the eggs were found to be small and numerous; and this,

the observer remarks, may account for the unusual excitement manifested by these birds in pairing time. But, he adds, why there are so many is a mystery.

It is, perhaps, consistent with natural law that everything should be abundant; but from this bird, it is said, no more than two young are hatched in a season, consequently no more eggs are wanted than a sufficiency to produce that effect. Are the eggs numbered originally, and is there no increase of number, but a gradual loss till all are deposited? If so, the number may correspond to the long life and vigorous health of this noble bird. Why there are but two young in a season is easily explained. Nature has been studiously parsimonious of her physical strength, from whence the tribes of animals incapable to resist derive security and confidence.

That which the indefatigable Mr. Gould could not obtain in the native country of the bird, he may now find in the Garden of the Zoological Society of London. The wedged-tailed eagle,* the *Wol-dja* of the aborigines of the mountain and lowland districts of Western Australia, the eagle-hawk of the colonists, and the mountain eagle of New South Wales of Collins, laid the first egg deposited in this country by one of her race on the 27th of February, in the present year. On the 28th it was placed under a common hen, which sat very close but fruitlessly, and on the 21st of March the addled egg was removed. On the 4th of March she laid a second egg, which was also placed under a hen now sitting.

* *Aquila fucosa*, Cuv. In the gallery of the French Museum it appears to have been ticketed, according to Mr. Bennett, as *Aquila fuscosa*, a name under which it is mentioned in the Supplement to the *Dictionnaire des Sciences Naturelles*, in the English translation of Cuvier's work, and in the last edition published by himself. Mr. Bennett supposes that this 'unmeaning term' crept in erroneously for *fucosa*, as Temminck and Vigors both write it, and as ornithologists now generally do. Some better appellation than either might have been found for so noble a species. But names must not be altered, or the greatest confusion—there is quite enough already—would prevail.

What the golden eagle is to the northern hemisphere, the wedge-tailed eagle is to the southern. Universally spread over the southern portion of Australia, numerous in Van Diemen's Land and on the larger islands of Bass's Straits, Mr. Gould is of opinion that it will, in all probability, be found to extend its range as far towards the tropics in the south as the golden eagle does in the north. Of great power and ferocity, it is the scourge of the shepherds and stock-owners, who wage deadly war against it, and unweariedly seek its extirpation. One, killed by Mr. Gould, weighed nine pounds, and measured six feet eight inches in alar extent; but his impression is, that far larger individuals have come under his notice. Some opinion of its strength may be formed from the act of the bird figured by Collins, which was captured by Captain Waterhouse, during an excursion to Broken Bay, and struck its talons through a man's foot, while lying in the bottom of the boat with its legs tied together. During the ten days of its captivity it refused food from all but one person. The natives, who looked on it with fear, could not be prevailed on to go near it, and they asserted that it would carry off a middling-sized kangaroo. But the brave bird could not brook confinement; and one morning the broken rope by which it was fastened was all that remained. The captive had divided the strands and soared away.

Its natural prey consists chiefly of the smaller species of kangaroo. These its piercing eye detects as it wheels aloft, circling gracefully till a victim is marked, when down it comes with unerring and fell swoop. Mr. Gould states that the bustard,* whose weight is twice that of

* This was probably the bird shot by Mr. Ferdinand Bauer on Wellesley's Islands, which weighed between ten and twelve pounds, and made Captain Flinders and his party 'an excellent dinner,' after poor Mr. Bauer had carried it on his back many a weary

its enemy, and which finds a more secure asylum on the extensive plains of the interior, is not safe from its attacks; and Mr. Cunningham mentions even the emew as its prey. But the kangaroos seem to have been its staple, and probably still are in those parts of the interior where civilized man has not yet penetrated. Of the multitudes of those quadrupeds in old times, we may judge by the account given by Captain Flinders of Kangaroo Island, where they were living in amity with the seals, as appears from the picturesque engraving from the drawing made by the lamented Mr. Westall. The captain writes that it was too late to go on shore in the evening of Sunday, 21st March, 1802, but every glass in the ship was pointed there to see what could be discovered. Several black lumps, like rocks, were asserted to have been seen in motion by some of the young gentlemen, of whom the gallant Sir John Franklin, for whose safety all good men pray, was one. Next morning a number of dark-brown kangaroos were observed peaceably feeding upon a grass-plat by the side of a wood, and the landing of Captain Flinders and his party gave the unsuspecting animals no disturbance.

I (writes the captain) had with me a double-barrelled gun, fitted with a bayonet, and the gentlemen, my companions, had muskets. It would be difficult to guess how many kangaroos were seen; but I killed ten, and the rest of the party made up the number to thirty-one, taken on board in the course of the day—the least of them weighing sixty-nine, and the largest one hundred and twenty-five pounds. These kangaroos had much resemblance to the large species found in the forest lands of New South Wales; except that their colour was darker, and they were not wholly destitute of fat.

The captain records this slaughter with some compunction.

furlong. The captain remarks that the flesh of this bird is distributed in a manner directly contrary to that of the domestic turkey; the white meat being upon the legs, and the black upon the breast.

After this butchery, for the poor animals suffered themselves to be shot in the eyes with small shot, and in some cases to be knocked on the head with sticks, I scrambled with difficulty through the brushwood and over fallen trees, to reach the higher land with the surveying instruments; but the thickness and height of the wood prevented anything else from being distinguished. There was little doubt, however, that this extensive piece of land was separated from the continent; for the extraordinary tameness of the kangaroos, and the presence of seals upon the shore, concurred with the absence of all traces of men to show that it was not inhabited.

But the sheep now walks where the kangaroo formerly bounded, and the wedge-tailed destroyer makes terrible havoc with the lambs. Not that it will refuse carrion; for Mr. Gould, during one of his journeys into the interior to the northward of Liverpool Plains, saw no less than thirty or forty assembled together round the carcase of a dead bullock; some, gorged to the full, perched upon the neighbouring trees, the rest still in the enjoyment of the feast. And he adds, that for the sake of the refuse thrown away by the kangaroo hunters it will often follow them for many miles, and even for days together.

The nests observed by the same scientific traveller were placed in the most inaccessible trees, were very large, nearly flat, and built of sticks and boughs. The eggs he never could procure.

The latest news from Egypt reports the young hippopotamus to be thriving and waxing strong, but more good-natured and amiable than ever. His teeth are advancing: he takes his rice and meal with such a hearty good-will that his allowance of milk—to the great comfort, no doubt, of the good people of Cairo, who must have had some fears of a famine of that nutritious beverage—is reduced to fifty pints a-day; and this Brobdignag baby has contrived to win good Mr. Murray's heart so effectually, that it is hoped he may embark for England, with his huge pet, somewhere about the 10th of May next, by which time

it is expected that the infant's daily stint may be comfortably lowered to twenty-five pints. And so farewell, friendly reader, for the present. Before these notes meet your eye the groves and gardens will be vocal, and rejoicing nature will be glowing under the influence of spring,—

Cum Zephyris et hirundine primâ.

May, 1850.

CHAPTER VI.

PARTHENOPE, Ligeia, Leucosia—these are pretty names as ever were bestowed on the offspring of a river god and a muse; nor are Molpe, Aglaophonos, and Thelxiope*—which some will have it were the true designations of the daughters of Achelous and Melpomene—unmusical. Blessed with powers of voice and fascination equal to Sontag—for, however the *habitués* of her Majesty's Theatre may reasonably doubt it, they too were irresistible,—the sirens, unlike that fair, spotless enchantress, poured forth their gush of song to the ruin of their entranced audience, though they certainly never executed Rode's variations; it may, indeed, be doubted whether any sublunary being, with the exception of the gifted countess, ever could—at least with her supreme excellence. And so these accursed of Ceres continued in their course of musical murder, surrounded by the corpses of their victims, whose remains were wreathed with flowers, radiant with beauty, as our own Etty has depicted them, till their career was closed by the wily Greek, who had received his lesson from another mistress of enchantment; and so they perished.

But, it seems, their crimes were not sufficiently expiated. Years rolled on their ceaseless course. Greece

* Or, according to others, Thelxione. The maternity is given by some genealogists to Calliope, by others to Terpsichore; but the better opinion is, that Melpomene was the mamma of these deluders. Like other irregular branches of families they became troublesome to theirs; a meddling friend, Hera, excited them to contend with the Muses, who conquered them, and, as a punishment for their presumption, tore off their wings.

was swallowed up by Rome, who in her turn fell at the feet of the Goth; and in the fulness of time there arose a wizard from the great northern hive, he of the polar star, who waved his wand, aroused the Sirens from the annihilation into which they had escaped, and degraded them into one of the lowest reptile forms of America.

The Arabs have a saying that monkeys are enchanted men, and the most elegant of modern poets has been heard to declare that they reminded him of poor relations: but what is the lot of humanity so transformed compared to the degradation of sirens into Perennibranchiate Batrachians.

What on earth are Perennibranchiate Batrachians?

A Batrachian, in the language of the learned, means a reptile of the great frog family, and a Perennibranchiate—there is certainly some sesquipedality in the word, as there too often is in those coined by the scientific; with all due submission to their worships be it written—a Perennibranchiate Batrachian is one that does not go through metamorphosis, like a common frog, for instance (which first bursts upon the aquatic world as a tadpole, then acquires limbs, and then drops his tail and gills, as becomes a citizen of the terrestrial as well as the watery world thenceforth blessed with lungs), but remains a gill-breathing, muddy, fishlike groveller, all the days of its life.

In my zoological obituary for last March, I find the death of *Siren lacertina* recorded towards the end of the month. The melancholy event took place in the Garden of the Society in the Regent's Park, where the siren had lived for many years in the parrot-house, domiciled in a vessel of pond water, with a bottom of deep mud. It was during its life as vivacious as anything existing in inky-looking mud could be, and thrived well on worms—with some dozen and a half of which it

was daily supplied—and small fish. It was very eel-like in its motions, though blessed with two small anterior extremities; but as you may wish to know something about the animal, curious reader, here is a description of it, which those who are not inquisitive may skip if they please.

The generic character of the sirens consists in an elongated form, nearly similar to that of the eels. There are three external branchial or gill tufts on each side. No posterior feet, but two anterior small ones. Not a vestige of a pelvis. The head depressed; the gape of the mouth moderate; the muzzle obtuse; the eye very little; the ear concealed; the lower jaw sheathed with a horny substance, and armed with several rows of small teeth; the upper jaw toothless; on the palate numerous small retroverted denticles.

Such is the reptile of which Dr. Garden, in the years 1765, 1766, sent a description to Ellis and Linnæus, when the immortal Swede established an additional order for the siren in his class *Amphibia*—the order *Meantes*. Such is an outline of the creature which Cuvier pronounced to be one of the most remarkable of the class of reptiles, nay, of the whole animal kingdom; a bold declaration, but borne out by the anomalies of its structure, its relationship to different families, and its approximation even to different classes.

Thus, Pallas, Hermann, Schneider, and Lacépède, classed it as the larva of a great unknown salamander. Camper placed it among the fishes. He was followed by Gmelin, who made an eel of it, conferring on it the name of *Muræna siren*; and 'tis almost a pity that the last-named worthy doctor was dead wrong in making it a *Muræna*: it would have been so everlasting classical for that enlightened Republican, brother Jonathan, who loves to copy the Romans, to have thrown his slaves to the *Murænæ*. But he may still be imitative, and throw

them to the Sirens. Only, instead of going to the rock and deep blue sea where the sirens of old haunted, as you, young gentleman, have read in your Virgil,* he must condemn them to be laid in the marshes where the luxuriant crops of rice wave. There, and in swamps, under the entangled roots of time-worn trees, the American siren lurks, and thence obtained the somewhat unclassical name of 'The Mud Iguana.' And if you wish to be acquainted with the proportions of the transatlantic form, know that *Siren lacertina*, one of the sisters (whose death we have above recorded), grows to the length of three feet, a dark anguillary beauty of some intensity of colour, with two little hands (or fore feet, if you must be critical), of four fingers each, and instead of lower extremities a compressed tail, with an obtuse fin. When I last saw the defunct, the creature was as large as a child's wrist, and flounced about most vigorously upon being lifted out of its inky bed. Death came upon it at the end of March. Two days before the fatal event it had devoured two small fishes. The weather was unseasonably cold, and frost and snow prevailed.

But the siren has, of course, some vocal power ?

As if to make the mockery complete, this siren was said to have the voice of a duck ; but even this has been denied. The captive siren of the Regent's Park was never heard to utter any sound.

This is no place for anatomical or physiological detail, or much might be said relative to this most curious form. Those who feel interested will be rewarded for referring to John Hunter, Cuvier, and Owen. The last-named distinguished comparative anatomist has recorded some most valuable observations on the blood-discs of

* *Æneid*, v. 684. These rocks are understood to have been the island of Capreæ, the retreat of the tiger-like Tiberius, who, it is said, could see like a cat in the dark.

this batrachian, and their comparison with those of man.* The siren's blood-discs were obtained by the professor from one of the external gills of the deceased specimen when it was in good health, in the month of October 1841.

But, without loading these pages with scientific disquisition, it is impossible that any one should even glance at the history and conformation of the sirens without being struck with the anomalies which they present. Pallas and the other distinguished zoologists above mentioned may well be pardoned for considering the form that of one of the *Salamandridæ* in its progress to perfection. The first sight of it suggests the presence of a salamander in a metamorphic stage, and it is only upon close examination that the observer is satisfied that the animal has reached its completion. It is as if Nature had been determined to show, that if she wished to indulge in the freak she could arrest the animal's development, and under the guise of a salamandrian larva present a creature perfect according to its kind, and forming a finished link in the great chain of beings; as perfect, after its kind, as *Sieboldtia maxima*, in which enormous newt, the slits of the gill-aperture—which always remains open in *Menopoma*, an American salamandrian—are closed.

Dr. Von Siebold found this creature—which comes nearest of living beings to Scheuchzer's *Homo diluvii testis*, now termed *Andrias Scheuchzeri*, and which has been proved to be a great fossil salamandrian—in a lake on a mountain of basalt, in Japan; just such a locality as we find assigned in the *Arabian Nights* to enchanted aquatics. The doctor brought away with him, some twelve years since, a male and a female; but the former

* See *Penny Cyclopædia*, article 'Siren (Zoology),' vol. xxii. p. 66; where these observations and a history of the animal will be found.

was so fond of his wife that he ate her up on the passage home, and arrived, consequently, in the best health and spirits at Leyden, measuring about three feet in length.

About the time of the siren's death there were hopes that a young dromedary would make its appearance; and, indeed, one had been born in the Regent's Park previously. But in this last case the young creature was stillborn, though its mother had bred it well. The period of gestation is stated to be between eleven and twelve months.

Viewed with the eye of even a comparatively careless observer, the camel presents one of the most complete instances of design with relation to human wants. There is not a part of its structure, from the bony framework of the skeleton to the external hair of its coat, that could be omitted without injury to the wonderful work, or improved. Those very parts which seem deformities are absolutely necessary to its well being and destination, and the hump and callosities become beauties when examined with reference to the exigencies of the animal, and its condition as the slave of man.

And here arises the question whether this hump and these callosities are natural formations, or due to the pressure of the loads with which the animal has for ages been burdened, and to the weight of its body. The callosities are seven in number, and upon these the pressure of the body is thrown when the creature kneels down and rises up. They have been observed upon a newly-born camel; but no child is born with corns on the toes and feet, whatever fashion and tight shoes may have done for its parent—at least I never heard of a baby who came into the world with those excruciating afflictions. Not that it may not be admitted, that in a long course of years these marks of servitude, as they have been termed, may have been more largely developed. Dr. Walter Adam, in his paper on the osteology of the

Bactrian camel, remarks, that the dorsal vertebræ of the animal on which he made his observations had been modified by the pressure of its loads. We know that by careful breeding the horns of the ox and the sheep may be made to assume almost every grade of excess and defect, till they vanish altogether, and a hornless race is obtained. Those who delight in oddities know how to secure a breed of rumpless fowls and tailless cats. The dapper, clean-legged bantams, for which Sir John Sebright was famous, were remarkable for the absence of the sickle-shaped, drooping feathers, from the tails of the cocks, whence they were called by some bird-fanciers 'Hencocks.' This absence had been the result of the greatest care and attention to the breed. In all these cases the change or modification is limited to externals. The internal organization of the animals remains absolutely the same.

Now, whether we look at the grotesque figure of the camel, or investigate its internal structure, we find the most unmistakable evidence of adaptation to that state of life to which it has pleased the great Author of its being to call it. Born for the desert, the callosities prevent the skin from cracking at those points where the weight of the animal rests upon the arid, burning sands. The strong, nipper-like upper incisor teeth are fit instruments for cutting through the tough plants and shrubs that spring here and there on those boundless wastes. The nostrils are so organized that the animal can effectually close them, and defy the stormy destructive sand-drifts that sweep harmlessly by him. 'The desert ship' seems to float rather than step on the elastic, padlike cushions of its spreading feet, moving as noiselessly as Mr. Mark's vulcanized indian-rubber wheel-tires convey a carriage over a granite pavement.

What always struck me as something extremely romantic and mysterious (writes Mr. Macfarlane) was the noiseless step of the

camel, from the spongy nature of his feet. Whatever be the nature of the ground—sand, or rock, or turf, or paved stones—you hear no foot-fall; you see an immense animal approaching you stilly as a cloud floating on air, and unless he wear a bell, your sense of hearing, acute as it may be, will give you no intimation of his presence.

Riley, too, notices the silent passage of a train of camels up a rocky steep, and accounts for the silence because their feet are as soft as sponge or leather. The structure of his stomach enables the camel to digest the coarsest vegetable tissues, and he even prefers such plants as a horse would not touch to the finest pasture. He is satisfied with very little, and if he should be stinted even of this hard fare, the fat hump contains a store of nourishment to be taken up into the system, and sustain it till he reaches some oasis of tough prickly bushes, which he discusses with the greatest relish; and if the best of liquids be there, fills the water-tanks with which his interior is fitted up, and goes on his way rejoicing.

One word more—without trespassing upon the province of the anatomist or the patience of the general reader—as to the modification which even the hardest parts of the animal frame will undergo to answer the exigencies of the demand. Dr. Adam found that the burdens of the baggage-camel from Bengal, which he examined, and which—poor, indefatigable workman—had done its duty more scrupulously than many of the biped labourers in the vineyard of this world, had much altered the form of the dorsal vertebræ. He observed that the natural breadth of the bodies of those vertebræ seemed to be not greater than the wideness of the nostrils; but, owing to the great weights borne by the patient animal whose remains came under the doctor's observation, the enlargement was such that those bones presented an instance of exostosis rather than of normal proportion—though still that enlargement had been controlled by the laws of symmetry. The greatest breadth was attained at

the connexion of the fifth and the sixth dorsal vertebræ : there the pressure of the burdens had evidently been most severe ; and the summit of the hump was at the sixth. Thus was the back strengthened for the burden.

Dr. Adam suggests, that it is not improbable that the symmetry of the swift dromedaries will be found to be much more complete than that of the baggage-camel. The load for the latter is variously stated ; some make it six, some seven, and others above eight hundred pounds ; nay, Sandys says that he will carry a thousand. The swiftness of the dromedary,* *el heirie*, or, as most travellers call it, *maherry*, may be compared with that of the high-mettled racer, with more endurance. ‘ When thou shalt meet a heirie, and say to the rider Salem Aleik, ere he shall have answered thee Aleik Salem, he will be afar off, and nearly out of sight, for his fleetness is like the wind.’ A *sabayee*, said to be the swiftest of this breed, is good for six hundred and thirty miles (thirty-five days of caravan-travelling) in five days. Seven or eight miles an hour, for nine or ten hours a-day, is stated to be a common performance ; and the lamented Captain Lyon, whose accuracy was strict, relates that a Northern African Arabian maherry’s long trot, at the rate of nine miles an hour, will endure for many hours together.

Cupid has been pictured bestriding the lion and the dolphin, and Darwin has made him inspire plants with love ; but when he takes the shape of an Arabian lover, and mounts his dromedary, nothing seems impossible—space and time are annihilated. It is on record that a young man was passionately fond of a young girl—lovely, of course,—and who on her part had a devouring passion for oranges. None were to be had for love or money at Mogadore, and no fruit worthy of the damsel could be

* *Καμηλος δρομος*—*Camelos dromas*, running or swift camel.

procured nearer than Marocco. The lover mounted his heirie at dawning, sped him away to Marocco, a hundred miles from Mogadore, bagged the desired oranges, and returned that very night; but too late to pass, for the gates were shut. The beauty, however, was not disappointed, for the gallant Arab made a friend of one of the guards of the batteries, who conveyed the golden fruit to the charming expectant. And here the story ends, and it is well that it does so. The natural hope of plodding Europeans is, that they were married, and lived long and happily: but then comes the painful truth. Beauty, which in our northern climes endures long in rich ripeness, is in Arabia as fleeting as one of its own flowers. Nothing, we are told, can exceed the prettiness of an Arab girl, but the hideous—yes, that is the gallant traveller's word—the hideous ugliness of the old women.

‘Train up a child in the way he should go,’ and, acting upon this principle, the camel-drivers in some parts of Africa—Senegal for instance—were wont, soon after the birth of a young camel, to tie its feet under its belly, throw a large cloth over its back, and place heavy stones upon each of the corners of the cloth that rested on the ground. Thus did the Moors accustom the animal to receive the loads which it was destined to carry through a life of labour, generally prolonged to twenty years. Females, indeed, and such fortunate males as are exempt from work, are said to live for twenty-five, or even thirty years.

The European mode of training is not commenced till the camel has attained the age of four years, when the trainers first double up one of his fore legs, which they bind fast with a cord; this they pull, and thus compel the trainee to come down upon his bent knee. But all pupils are not equally docile; and if this method should fail, as it sometimes does, both legs are tied up, and the camel falls upon both knees, and on the callosity which

protects the breast. This operation is often accompanied by a cry and a slight application of the whip from the trainer; and, by degrees, the animal learns at last to lie down upon its belly with its legs doubled under it, at the well-remembered cry and blow, accompanied by a jerk of its halter. Having attained so much obedience, the trainer proceeds to place a pack-saddle on the creature's back. When it is accustomed to this appendage a light load is put on, and gradually increased till it reaches the maximum, which is generally understood to be fourteen killogrammes, or above eight hundred pounds, for a full-grown camel.

Such is the mode practised at Pisa; and though the Moors brought the animal into Spain, Pisa appears to be the only locality in Europe where the camel is now bred. The arid plains and stunted vegetation at San Rossora seem to have pointed it out as the proper place for this experiment; but though success attends it, the breed seems to dwindle. The foal is obliged to be held up by attendants to take the maternal nourishment, which in a state of nature the new-born creature must be in a condition to obtain without assistance, or the continuation of the species must cease. And here it may be observed, that we have no authentic account of the camel in a genuine wild state. The earliest records, from the sacred Scripture downwards, present it in a domesticated state. When Joseph was cast by his brethren into the pit, and the criminal fraternity sat down to eat bread, they lifted up their eyes and looked, and behold a company of Ishmaelites came from Gilead with their camels, bearing spicery, and balm, and myrrh, going to carry it down to Egypt. And yet in Egypt itself no trace appears to have been observed on the multitudinous ancient monuments of the form. It is, indeed, to be seen on the frieze of the building at Ghirza, where it is introduced four several times; and, in one instance, a female drome-

dary is suckling her young one. When Gideon arose and slew Zebah and Zalmunna, he took away the ornaments that were on their camels' necks. Jacob divided the people that was with him, and the flocks, and the herds, and the camels, into two bands; and thirty milch camels and their colts formed part of the present which he sent to propitiate his ill-used brother Esau. The camel appears in the forbidden list set forth in Leviticus, because he cheweth the cud but divideth not the hoof. The Chaldeans made out three bands and fell upon Job's camels, of which he had three thousand, and carried them away; and when the Lord blessed the latter end of Job more than his beginning, the comforted patriarch possessed six thousand. When Xerxes invaded Greece camels figured as part of his enormous host. The Arabians were stationed in the rear, that the horses might not be frightened, because they cannot endure camels—of which more anon; and when the Great King was marching through the Pæonian and Crestonian territories towards the River Echidorus, lions came down in the night and attacked the camels, seizing them only, and leaving man and every other beast unharmed. Herodotus expresses his wonder that the lions should abstain from all the rest and set upon the camels,—beasts which they had never before seen or tried,* as was probably the case with those lions. Before the camel was known in Africa, beyond the Nile, the country abounded with lions, and was a kind of preserve whence the proconsuls drew their supplies for the Roman amphitheatre; but about the middle of the third century, when the Arabs entered Africa, the numbers of these ravenous beasts of prey were greatly diminished; so much so, indeed, that hunting them was forbidden, except in the case of privileged persons,—a prohibition which originated in the apprehension that

* *Polymnia*, 125.

there would be few or none left for the circus. Honorius put an end to this prohibition, and then the destruction of the lions followed ; cultivation increased ; camels were introduced, facilitating communication from one point to another without risk of leonine attack ; and civilization advanced.

It has been already observed, that no authentic record appears of the existence of camels in a wild state.* And though M. Desmoulins is of opinion that they were to be found in that state in Arabia at the beginning of the second century, and though the natives of Central Africa declare that wild camels wander free in the mountains where European feet have never trod, such assertions are by no means conclusive : for, granting them to be true, such camels may have been descended from domesticated parents, which had, like the American horses, escaped from their owners. In one expedition directed by the great Assyrian queen, (whom Ninus coveted from the despairing Menones, and obtained to his own destruction,) three hundred myriads of foot, a hundred myriads of horse, ten myriads of scythe-armed chariots, as many of fighting men mounted on camels, and seventy myriads more of those beasts destined for various services, were among the hosts collected at her command. Camels also carried the artificial elephants, which, to the number of two millions, Semiramis employed in her Mesopotamian expedition against the Indians, in which she was wounded. But if the mother of Vathek had her Alboufaki, the most hideous, malignant, and swift of dromedaries, the daughter of Derceto was mistress of one which, though it may not have rivalled that of Carathis in ugliness and unearthly propensities, saved her by its fleetness. Poor Zenobia

* With reference to this question it may be worthy of note, that the fossil remains of a camel are said to have been detected by Col. Cautley in the sub-Himalayan range.

was not so fortunate, for the swiftness of her dromedaries could not prevent her from falling into the hands of Aurelian.

In ancient war, besides their use as beasts of burthen, the swifter races, the maherries of that day, drew the rapid scythed-chariots, mowing down masses of men in their course; or carried bowmen, armed also with long swords, to enable them to reach the cavalry and infantry in personal encounters.

As for camels, they are nourished in the Levant or East parts (quoth Philemon Holland, in his translation of Pliny), among other herds of great cattell: two kinds there be of them, the Bactrians and the Arabick: differing herein, that the Bactrians have two bunches upon their backs; the other but one apiece there; but they have another in their brest, whereupon they rest and ly. Both sorts want the upper row of teeth in their mouthes, like as bulls and kine. In those parts from whence they come they serve all to carry packs, like labouring horses, and are put to service also in the wars, and are backed of horsemen: their swiftness is comparable to that of horses; they grow to a just measure, and exceed not a certain ordinary strength. The camell, in his travelling, will not goe a iot farther than his ordinary journey; neither will he carry more than his accustomed and usuall load. Naturally they doe hate horses. They can abide to be four daies together without drinke; and when they drinke or meet with water they fill their skin full enough to serve both for the time past and to come: but before they drinke, they must trample with their feet to raise mud and sand, and so trouble the water, otherwise they take no pleasure in drinking. They live commonly fifty yeares, and some of them a hundred. These creatures also otherwise fall to be mad, so much as it is. Moreover, they have a device to splay even the very females, to make them fit for the warres; for if they be not covered, they become the stronger and more courageous.

There is one manifest error in this account, showing that Pliny never could have looked into a camel's mouth, which has two pointed incisive teeth implanted in the upper jaw, forming with the six lower incisors a formidable pair of nippers, admirably adapted for cutting through the tough plants which form the principal food

of the animal. The age, too, is nearly double that assigned to the camel by the moderns. The antipathy of the horse, which is frequently alluded to by the ancients, still exists in full force, and appears to be mutual, where use has not reconciled it to the camel, —

Utque aquilam cygnus, congrum muræna, camelus
Odit equum.

Cyrus availed himself of this antipathy on the suggestion of Harpagus the Mede, to the utter discomfiture of Cræsus. He gathered together the multitude of camels that followed his army with provisions and baggage, caused their burthens to be taken off, and armed men to mount them, and then ordered them to go in advance of the army against the Lydian horse. His infantry he placed immediately behind the camels, and his cavalry in the rear of the infantry. Then he gave the cruel word for no quarter, except to Cræsus, who was on no account to be killed, whatever resistance he might make. He thus disposed his troops, adds Herodotus,* for this reason — a horse is afraid of a camel, and cannot endure its sight or smell; and he had recourse to this stratagem that the cavalry, by which the Lydian expected to win, might be useless to Cræsus. And so it fell out; for when they joined battle, the horses no sooner smelt and saw the camels, than they turned tail and destroyed the hopes of Cræsus.

Even now, at Pisa, it is found necessary to reconcile the horses to the sight of the camels, in order to prevent accidents; and where the precautions of such training have not been adopted, the sudden and dangerous terror with which a horse is seized on coming unexpectedly upon one of them is excessive.

The madness alluded to by Pliny probably refers to

* Clio, 79.

the violence of the male at certain seasons, when a portion of the *velum palati* is protruded with a strange and loud noise. Cupid makes many of his votaries play as strange love-pranks as ever the crazy Don performed ; but when he bestrides a camel, he makes the impassioned brute absolutely rabid.

Advantage is taken of this state of excitement by the turbaned Turk ; and two rivals are pitted, who at once rush at each other, and a regular combat follows. Before they are let go they are muzzled after a fashion, so that no deadly injury can ensue. Then they turn to like Cornish wrestlers, standing on their hind legs, embracing each other with their anterior extremities, twisting their necks together, and each striving to overthrow his adversary. Fired at the sight, the Turk loses his staid and apathetic demeanour. He claps his hands, and shouts out the name of the favourite which he has backed with an energy worthy of Hockley Hole and Marylebone in the old time, before modern statutes had prohibited the brutalizing dog-fights, bull and badger-baits, which, in other days, formed the amusement of the high and low vulgar. A vestige of the old English spirit still lingers, and snatches of ancient songs commemorative of the departed rugging and riving era may yet be heard *in triviis*.*

Mr. Macfarlane saw one of these got-up camel-fights

* For instance, an itinerant melodist was regaling the ears of his audience the other evening with a racy composition, which included the following stave :—

As for sentiment, and that 'ere stuff,
It's a thing I can't abide ;
Give me a jolly butcher, with his apron on,
And his bull-bitch by his side.

The song was altogether suggestive of the owner of the pair of boots, which Sir Edwin Landseer has immortalized in his incomparable ' Low Life.'

•

at a Turkish wedding in a village near Smyrna, and again at a festival at Magnesia. But he once, in the neighbourhood of Smyrna, saw a fight of a more serious character. Two huge camels broke away from the string, and set-to in spite of their drivers. They bit each other like furies, and the *devidjis*,* to whom in general these animals are most obedient and even affectionate, had the greatest difficulty in separating the enraged rivals.

On the Roman arena the camel was seen comparatively late, either as a mere spectacle or in a ruck with other beasts, and there is some foundation for the belief that camels appeared in the circus drawing chariots four-in-hand; not as we drive, but all four in the same line, yoked together abreast.

Ptolemy evinced his respect for the human race by showing together two novelties in the Egyptian theatre, namely, a black camel and a parti-coloured man, the latter being half white and half black.

Without stopping to inquire about the dimensions of the table of that mighty monarch, who, according to some retailers of wonders, had a whole camel served to his robust guests, or whether the said thaumaturgists had not misread a passage which set forth how the entertainer, in his royal magnificence, had sent away the guests, after a feast worthy of Lucullus himself, enriched with golden crowns, massive silver vases, slaves, and a camel each, we may be content with knowing that the milk and flesh of the animal are said to be as welcome to the Arab as those of the rein-deer to the Laplander; and as there is too frequently but one step between the pleasures of the table and the prescription of the physician, let us see what the ancient pharmacopœia owed to the camel:—

* Camel-drivers.

His braine (by report) is excellent good against the epilepsie or falling sicknesse, if it be dried and drunk with vinegar : so doth the gall likewise, taken in drinke with hony : which also is a good medicine for the squinancy.*

In cases of obstinate alvine obstruction a dried camel's tail was held to be infallible. The droppings 'reduced into ashes and incorporate with oile, doth curle and frizzle the haire of the head.' This may have been among Antony's cosmetics :—'The said ashes made into a liniment and so applied, yea, and taken in drink, as much as a man may comprehend with three fingers, cureth the falling sicknesse ;' and, no doubt, 'Great Julius' took it. 'The haire of their tails twisted into a wreath or cord, and so worn about the left arme in manner of a bracelet, cureth the quartan ague ;' and if Caius Ligarius had worn such an antidote, he might not have suffered so much from

That same ague which had made him lean.

The antipathy between the horse and the camel no longer exists in the East, where their association has so long and so continually been effected. For many centuries the camel has been the great transporting power, where no other vehicle could have answered the purpose. Old chronicles record that the three Magian kings came mounted on swift dromedaries to the adoration of 'the Heaven-born child ;' and the slower race have long formed the great medium of commercial intercourse. As a shepherd knows his sheep, so do the devidjis or camel-drivers distinguish their camels, and they talk of their points as a jockey speaks of those of a favourite horse ; nay, a Bedouin knows the print of his own camel's foot, and will thus track it when it has wandered. Nothing can be more orderly than the progress of the caravans. The camel moves like clock-work ;

* Holland's Pliny.

and the caravans or strings of camels are, Mr. Macfarlane tells us, always headed by a little ass, on which the driver sometimes rides, and which has a tinkling bell round its neck. Each camel, he adds, is commonly furnished with a large, rude, but soft and pastoral-sounding bell, suspended to the front of the pack or saddle. If these bells be removed by accident or design, the camels, like the mules of Spain and Italy, will come to a dead stop; and Mr. Macfarlane adds, that, like the mules also, the camels always go best in a long line, one after the other. He tried the experiment of the bell at Pergamos. Two stately camels, the foremost furnished with the bell, were trudging along the road with measured steps. The bell was detached with a long stick. The camels halted, nor could they be urged forward till their ears were regaled with the well-known music. Mr. Macfarlane observes, that he uses the word 'measured,' not as a matter of poetry, but of fact; and he states that their step is so measured and like clock-work, that on a plain you know almost to a yard the distance they will go in a given time. In the flat valleys of the Hermus and Caicus he made calculations with a watch in his hand, and found, hour after hour, an unvarying result, the end of their journey being performed just at the same pace, three miles an hour, as the beginning. The camel is, indeed, the creature of order and regularity. Each has his place in the line; and if this be interfered with, the beasts become disorderly and will not march. 'Each gets attached to a particular camel of the caravan, prefers seeing his tail before him to that of any other, and will not go if you displace his friend.'

But the Egyptians do not move in single file; they, on the contrary, march with a wide-extended front. Caravans from Bagdad to Aleppo and Damascus have been said to consist of camels marching abreast of each other, and sometimes extending over a space of more than a mile.

Old authors notice the training of camels to move in measured time by placing the animal on gradually heated plates, and at the same time sounding a musical instrument. The carriage of the head, so frequent a theme of eulogy with the Arabian poets, is due to the atlas, and the adjustment of the other osseous and muscular machinery. The Arabs, who have among them most imaginative and finished *impro visatori*, compare the elegant movements of a beautiful bride to those of a young camel. The *Thousand and One Nights*, like most clever fables, have some foundation in fact, as is well known to the friends of the Arabian man of rank, who keeps his professed story-teller as an indispensable part of his establishment. African travellers relate that these friends will assemble before his tent, or on the platform with which the house of a Moorish Arab is roofed, and there listen, night after night, to a consecutive history, related for sixty or even one hundred nights in succession. The listeners on such occasions have all the air of being spell-bound, especially while hearing some of their native songs, which are frequently extemporized, full of fire, and appeal with irresistible force to the passions. 'I have seen,' says Major Denham, 'a circle of Arabs straining their eyes with a fixed attention at one moment, and bursting with loud laughter; at the next, melting into tears, and clasping their hands in all the ecstasy of grief and sympathy.' The good camel-driver frequently cheers his beast with one of these melodies, and divides his barley-cake with those

Mute companions of his toils, that bear
In all his griefs a more than equal share.
There, where no springs in murmurs die away,
Or moss-crown'd fountains mitigate the day.

But sometimes the poor slave suffers dreadfully from the zealous ignorance of those who have the care of him. The attention of Bishop Heber, when on his journey to

Cawnpoor, was attracted by the dreadful groans of one of the baggage-camels. He went to the spot and found that two of the camel-drivers had bound its legs in a kneeling posture, so that it could not stir, and were burning it with hot irons in all the fleshy and cartilaginous parts of its body. The good bishop inquired what they were doing, and was answered that the camel had a fever and wind, and would die if they did not so treat it; and die it did, after all, *secundum artem*. Our French neighbours love to be systematic, and thus classify the helpers of men: *Le médecin qui guérit*—he is very rare; *Le médecin qui attend la guérison*—much more common, but still comparatively rare; and *Le médecin qui tue*. The camel-doctors appear to have belonged to the last and most numerous class, though the treatment seems to have been somewhat similar to that practised on Rodin, for cholera, with success. Immersion in water seems to be most injurious to the camel; and after being compelled to pass through rivers, disease frequently supervenes. It also appears to be liable to intoxication without drinking stimulating liquors. 'Several of our camels,' says Dr. Oudney, 'are drunk to-day. Their eyes are heavy, and want animation; gait staggering, and every now and then falling as a man in a state of intoxication.' This arose, according to the doctor, from eating dates after drinking water; and he accounts for the effect on the animal by the probable passing of the fruit into the spirituous fermentation in its stomach—that wonderful stomach, which contains a series of reservoirs to enable the desert ship to pursue its voyage over the trackless and arid sands. Yes, it is so. Doubts have been entertained upon the authority of a celebrated name, for it has been stated by a distinguished comparative anatomist,* that John Hunter did not give credit to

* Sir Everard Home.

this assertion. But upon looking to the source—and, as Dr. Johnson said of conversation, it is of primary consequence in appreciating information to ascertain whether it comes from a spring or a reservoir—we find that Dr. Patrick Russell, the writer on whom Sir Everard depended for this contradiction of a generally received notion, states, in the appendix to his brother's *History of Aleppo*, that water, in cases of distress, is taken from the camel's stomach, and that it is a fact neither doubted in Syria nor considered strange. The doctor confesses that he never was himself in a caravan reduced to such an expedient, but he adds, that he has no reason to distrust the report of others, particularly of the Arabs; and he refers to the historian Beidawi, who, in relating the Prophet's expedition to Tabuc against the Greeks, observes that, among other miseries of the army, the belligerents were reduced to the extremity of slaying their camels to quench their thirst with the water contained in those animated water-skins. But further, the doctor records that on his return from the East Indies, in 1789, having heard accidentally that his friend Mr. John Hunter had dissected a camel, and was supposed to have expressed an opinion that the animal's power of preserving water in its stomach was rather improbable, he took an opportunity of conversing with that illustrious physiologist on the subject, when, he says, to the best of his recollection, John Hunter told him that he by no means drew any such absolute inference from his dissection; that he saw no reason for assigning more than four stomachs to the camel, though he could conceive that water might be found in the paunch little impregnated with the dry provender of the desert, and readily separating or draining from it. The doctor then goes into anatomical detail, and those who wish to follow him have only to go to the Museum of the College of Surgeons of London—the great John Hunter's great monument—

where they will find the reticulum, or water-bag of the camel, with such an explanation as a catalogue proceeding from the pen of Professor Owen only could give.

Then if we want extrinsic evidence, we have only to call one of the most truthful, amiable witnesses, that ever left friends to lament him. Captain Lyon, upon the occasion of a death of one of these animals, says, in his most interesting narrative—

I never before had an opportunity of observing how water is procured from the belly of a camel to satisfy the thirst of an almost perishing kafflé.* It is the false stomach which contains the water and undigested food. This is strained through a cloth, and then drank; and from those who have been under the necessity of making use of the beverage, I learn that the taste is bitter. As the animal had recently drank, its stomach was nearly full.

The sailor, whose love of adventure had induced him to make a land voyage, and who suffered accordingly (for, though full of resources, he must have been very much like a fish out of water—a salmon on a gravel walk, for instance), amused himself by making observations on the skin and skeleton of the defunct; and which way do you think his thoughts went? *Naturam expellas*, &c.; but you may be sure of the recurrence: why, in planning a boat out of the remains. He found that a most excellent contrivance might be made from them for the purpose of crossing rivers, the back-bone being used as the keel and the ribs as timbers. The formation of the chest of the camel struck him as being like nothing so much as the prow of a Portuguese beancod, or fishing-boat;† and, with the frankness of a sailor, he adds that it was in consequence of hearing the Arabs always calling it ‘markab,’ or ship, that the idea first occurred to him.

Ship, indeed; never was metaphor more true. Launched upon the sandy ocean, where the compass is

* Caravan.

† *Phaselus ille quem videtis hospites.*—(Catullus.)

not unfrequently used, the camel fleet pursues its voyage until it reaches its anchoring ground for the night in some brake well known to the devidjis, making commerce easy between nations, to whom the desert would otherwise be an unconquerable bar; or smoothes the dreary way from Damascus to Mecca for the Mahometan pilgrim. The camel of the caravans which trade between Cairo and the interior to spots still a blank on the map of the European geographer, becomes a slave-ship. When one of these slave-caravans reaches the open country, the miserable slave has to undergo the horrors of a sort of middle-passage in the desert, though his treatment, terrible as it is, is mild when compared with the agonies of the hold. He is made fast to a long pole, one end of which is tied to a camel's saddle, and the other, which is forked, is passed on each side of his neck and tied behind with strong cord, so as to render it impossible for him to get his head out: his right hand is fastened to the pole at a short distance from his head. Thus, with his legs and left arm at liberty, the slave is, as it were, taken in tow by the camel, behind which he marches all day long, and is cast off at night only to be put in irons.

The hadj, or pilgrim-caravan, pursues its route principally by night, and by torch-light. Moving about four o'clock in the afternoon, it travels without stopping till an hour or two after the sun is above the horizon. The extent and luxury of these pilgrimages, in ancient times especially, almost exceed belief. Haroun, of *Arabian Nights'* celebrity, performed the pilgrimage no less than nine times, and with a grandeur becoming the commander of the faithful. The caravan of the mother of the last of the Abassides numbered one hundred and twenty thousand camels. Nine hundred camels were employed merely in bearing the wardrobe of one of the caliphs, and others carried snow with them to cool their sherbet. Nor was Bagdad alone celebrated for such

pomp and luxury in fulfilling the directions of the Koran. The Sultan of Egypt, on one occasion, was accompanied by five hundred camels, whose luscious burdens consisted of sweetmeats and confectionery only; while two hundred and eighty were entirely laden with pomegranates and other fruits. The itinerant larder of this potentate contained one thousand geese and three thousand fowls. Even so late as sixty years since, the pilgrim-caravan from Cairo was six hours in passing one who saw the procession.

The departure of such an array, with its thousands of camels glittering in every variety of trappings, some with two brass field-pieces each—others, with bells and streamers—others, again, with kettle-drummers—others, covered with purple velvet, with men walking by their sides playing on flutes and flageolets—some glittering with neck ornaments and silver-studded bridles, variegated with coloured beads, and with nodding plumes of ostrich-feathers on their foreheads—to say nothing of the noble, gigantic, sacred camel, decked with cloth of gold and silk, his bridle studded with jewels and gold, led by two sheiks in green, with the ark or chapel containing the Koran written in letters of gold,—forms a dazzling contrast to the spectacle it not unfrequently presents before its mission is fulfilled. Numbers of these gaily-caparisoned creatures drop and die miserably, and when the pilgrimage leaves Mecca the air is too often tainted with the effluvia reeking from the bodies of the camels that have sunk under the exhausting fatigue of the march. After he had passed the Akaba, near the head of the Red Sea, the whitened bones of the dead camels were the land-marks which guided the pilgrim through the sand-wastes, as he was led on by the alternate hope and disappointment of the mirage, or 'serab,' as the Arabs term it. Burckhardt describes this phenomenon as seen by him when they were surrounded during a whole day's

march by phantom lakes. The colour was of the purest azure,—so clear, that the shadows of the mountains which bordered the horizon were reflected with extreme precision; and the delusion of its being a sheet of water was thus rendered perfect. He had often seen the mirage in Syria and Egypt: there he always found it of a whitish colour, like morning mist, seldom lying steadily on the plain, almost continually vibrating; but in the case above described the appearance was very different, and bore the most complete resemblance to water. This exact similitude the traveller attributes to the great dryness of the air and earth in the desert where he beheld it. There, too, the appearance of water approached much nearer than in Syria and Egypt, being often not more than two hundred paces from the beholders, whereas he had never seen it before at a distance of less than half-a-mile.

Will it be believed that some zoologists (among them we could mention a great name,*—the name of one who did glorious service in his day, but who was too prone to attempt to put Nature in the wrong) have endeavoured to account for the construction of the camel by a theory based upon the lengthened servitude of the animal? Now, if you grant, as you will not if you are wise, that the callosities of the camel were the result of an infinitesimal series of genuflexions, the slave-tokens of a long submission to the tyrant man, what will you make of the internal organization—of the cisterns which enable the animal to live where any creature not so provided must perish from thirst without artificial aid? Here are vast sandy deserts to be traversed before man can communicate with man. Where is the medium of communication? Nature presents an animal of surpassing endurance, capable, upon emergency, of sustaining a thirst of ten or twelve days' duration. The head is levelled directly

* Buffon.

forward, and lighted by eyes that can look onward, and in some degree backward, but which are protected from the downward stroke of the sun by an overhanging orbit which prevents the camel from looking upward. The nostrils are so formed that the animal has only to make the muscles do their duty to shut them against the sand-storm of the simoom. From the sole of the elastic foot to the crown of the well-balanced head the camel externally is formed for the destiny which it has to fulfil; and its internal structure is pregnant with proofs of its adaptation to its own wants as well as the wants of man on that particular portion of the earth where it is most vigorous: if it be taken thence and transplanted to other localities, it does its duty after a fashion, but the breed dwindles.

The geologist well knows that the disposition of the strata, after all the convulsions and disruptions they have undergone, is precisely that which presents the most accommodating surface to man. If they had remained as they were at first deposited, where would he have found that mineral wealth which is the great source of civilization? It is quite true that this very mineral wealth is enabling him to supersede the animal of which we have been treating, perhaps at too great length. The steam-power—Darwin was a great and true prophet*—may leave the camel far behind, even in the desert: but no sound physiologist can contemplate the creature without seeing in it an overwhelming manifestation of the wisdom of the Creator.

June, 1850.

* Soon shall thy arm, *unconquer'd steam*, afar
Drag the slow barge, or drive the rapid car.

This is fulfilled. Who shall say that the rest of the prophecy may not come to pass?—

Or, on wide waving wings expanded bear
The flying chariot through the fields of air.

CHAPTER VII.

THE hen which was induced, good easy Dame Partlet, to bestow her maternal affection upon an egg of the wedge-tailed eagle laid in the Garden of the Zoological Society, was,—it will be in the remembrance of those who amuse themselves by looking into these simple annals—‘left sitting.’

The first egg was laid on the 27th of February in this year, and was, it will be recollected, placed under a common hen, but was removed after the expiration of twenty-one days in an addled state.

The second egg—that on which the hen was left sitting at our last notice—was laid in the first week of March, and was removed, after a patient incubation of twenty-two days, addled also.

On the 29th of March a third egg was produced, but it was destroyed by the parents.

April 4.—Another egg was this day laid, but no attempt was made to get it hatched.

The imprisoned parents made a poor apology for a nest of birchbroom and straw—the materials within their reach; but instead of manifesting any intention to do the parental office, the birds wanted to destroy every one of the eggs, and the keeper found it necessary to look very sharp to prevent them from carrying their ovicidal propensities into effect.

This reversal of the great law of Nature is not confined to birds. The sow and the rabbit, if disturbed at the critical moment, will not unfrequently devour their offspring,—as those know to their cost whose impatience

has brought their prying eyes to look into the mystery. We forget that, in their natural state, the first care of all vertebrated animals is to hide their eggs or young. The same may be said of insects, crustaceans, and even of molluscous animals. In proportion as the organization is developed, the sensitiveness to the violation of this principle increases. The quadruped, in a state of morbid irritation, devours its young; the bird forsakes its nest or destroys the eggs.

When, however, this great operation of nature is effected in secrecy, and the *storge* of the parents is unchecked, the *vertebrata*, and especially the more highly-developed classes, will risk anything short of life for the protection of their young, and not unfrequently will lay that down in defence of their offspring.

In cases of extreme urgency, gregarious quadrupeds dispose of their young with the most parental care, placing them in the middle, so that when the battle rages they may have the best chance of safety. Thus by the divine law preservation follows generation, and is most conspicuously manifested while the offspring is of tender age, and unable to provide for its own support. Among the mammiferous animals a reciprocity of benefits is established, and it may be doubted whether the mother or the child feels the greatest enjoyment in imparting or receiving the full tide of maternal nourishment. Even that grand incarnate fiend, Lady Macbeth, is compelled to say,—

I have given sucke and know
How tender 'tis to love the babe that milkes me.*

Moreover, a sort of instinctive distributive justice is established in the breast of the mother, when the case requires it. Thus, as a general rule, it will be found that an ewe which brings forth two lambs at a time will

* Folio.

not admit one to her teats unless the other be present and partaking; otherwise one might famish while the other would grow fat.

This manifestation, for the most part, suits the tyrant man, and therefore, in all convenient cases, he very blandly suffers Nature to take her course. The Laplander cannot afford to be so benevolent. The female reindeer drops her fawn about the middle of May, and gives milk from the end of June to the middle of October. Now few mothers are more extremely fond of their young than these does. If they lose one they seek it everywhere, and, if it be to be found, never rest till they have discovered it. The Laplander, therefore, knows better than to separate the doe from the fawn. Morning and evening the herd is brought up to be milked. A rope, both ends of which are held in the hand of the assistant, is cast over the neck of the doe, and she is thus compelled to submit, giving about a pint. This might seem to be a sufficient fraud upon the poor fawn, but no. As soon as the pint is abstracted the teats of the doe are anointed with a preparation most offensive to the fawn, which thus, notwithstanding its intense disgust, gets just enough to preserve life and no more, and leaves the poor mother with a comparatively full udder to enrich the dairy of her honest master.

All animals of a high grade show the greatest distress if their young are taken from them, and will, if necessary, fight stoutly in their defence. In that most revolting case of the vivisection of a poor bitch, she endeavoured to lick her puppies in the midst of her tortures, and when they were removed uttered the most plaintive cries.

The crew of the discovery-ship *Carcass*, sent on an exploring voyage to the North Pole in the last century, witnessed a most touching instance of maternal affection, which seems, however, to have had no effect on the hearts of some of those who beheld it.

The ship was locked in the ice, and, early one morning, the man at the mast-head gave notice that three bears were approaching over the frozen sea, invited, doubtless, by the scent of some blubber of a walrus, killed by the crew a few days before, which had been set on fire and was burning on the ice. The visitors proved to be a she-bear and her two cubs, the latter nearly as large as the dam. They ran eagerly to the fire, drew away part of the flesh of the walrus that remained unconsumed and devoured it. Then the crew from the ship cast great lumps of walrus-flesh, which still remained, to them. These the old bear fetched away one by one, laying every lump before her cubs, dividing it into shares and reserving only a small portion for herself. As the unsuspecting mother was fetching away the last piece, the men levelled their muskets at the cubs and shot them both dead. They then wounded the dam, but not mortally. The rest must be told in the words of the relater:—

It would have drawn tears of pity from any but unfeeling minds, to have marked the affectionate concern expressed by this poor beast in the dying moments of her expiring young. Though she was sorely wounded, and could but just crawl to the place where they lay, she carried the lump of flesh she had fetched away, as she had done others before, tore it in pieces, and laid it down before them; and when she saw that they refused to eat, she laid her paws first upon one, and then upon the other, and endeavoured to raise them up; all this while it was pitiful to hear her moan. When she found she could not stir them, she went off; and when she had got at some distance, looked back and moaned; and that not availing her to entice them away, she returned, and smelling round them, began to lick their wounds. She went off a second time as before; and having crawled a few paces, looked again behind her, and for some time stood moaning. But still her cubs not rising to follow her, she returned to them again, and with signs of inexpressible fondness went round one, and round the other, pawing them and moaning. Finding at last that they were cold and lifeless, she raised her head towards the ship, and growled a curse upon the murderers, which they returned with a volley

of musket-balls. She fell between her cubs, and died licking their wounds.*

Birds, at other times the most timid of creatures, will boldly attack the spoiler of their nests and young. Thrushes, and even smaller birds, have been known to do battle with magpies, jays, crows, hawks, nest-robbing school-boys, and even men. The common hen will show fight to kites, dogs, cats, and unfeathered bipeds if they come near her chickens with sinister intentions, or even if they approach too closely. White, in his delightful book, mentions an instance of the fury with which some plundered hens wreaked their vengeance upon a reiver when, after repeated predatory acts, they had him in their power. He relates that a neighbouring gentleman, one summer, had lost most of his chickens by a sparrow-hawk, that came gliding down between a fagot-pile and the end of his house to the place where the coops stood. The owner, vexed to see his flock diminishing, hung a setting-net adroitly between the pile and the house, into which the caitiff dashed, and was caught:—

Resentment (continues the historian of Selborne) suggested the law of retaliation; he therefore clipped the hawk's wings, cut off his talons, and fixing a cork on his bill, threw him down among the brood-hens. Imagination cannot paint the scene that ensued; the expressions that fear, rage, and revenge inspired were new, or at least such as had been unnoticed before. The exasperated matrons upbraided, they execrated, they insulted, they triumphed. In a word, they never desisted from buffeting their adversary till they had torn him in an hundred pieces.

Ready and willing, however, as the parents are to defend their young against fearful odds, that modification of reason, which I have observed frequently to accompany mere instinct, operates occasionally to induce them to acquiesce patiently when help is required and given.

Every one has heard of partridges falling into cracks ;

* *Annual Register*, 1775, signed, 'Marinus.'

and many have looked upon these 'accidents' as inventions of John to account for the absence of eggs and birds which have found their way to distant parts per rail. But that such misfortunes do really happen there can be no doubt.

In a clayey country in Somersetshire where the cracks, one hot summer, had become dangerous even for dogs, two old birds were seen one fine morning in June 'in great trouble.' Upon looking about near the spot where they had been disturbed, a huge crack was seen to yawn, which, though not quite so big as the gulf into which Vathek tumbled the fair boys whom he offered to the insatiate Giaour, was all-sufficient for the purpose of swallowing up young partridges. The old birds had been scratching about the edge of the crack, where 'they had done more harm than good.' Upon looking in, a dozen young ones were seen down in the crack. They were hooked out one by one with a stick; and the parents stood, 'not more than a pole off,' anxiously watching the operation and receiving each of their offspring as it ran from the edge.

A hen, which was most pugnacious, flying fiercely at every one who came near her chickens, had wandered with her brood near a fagot-pile, into which they had scrambled, and had contrived so to entangle themselves that they could not get out. The piercing cries of the bewildered chicks were equalled by the fidgetty clucks and gestures of the mother. But when assistance came, instead of buffeting the helper, she stood patiently waiting till, after taking off some of the fagots, he caught her chickens and restored them to her.

A mare brought forth a foal some eight or ten days before its time. The foal was attacked with spasms in the stomach and bowels, and, as it generally happens in cases of premature birth among horses, died. Every aid that could be thought of was given; medicines were ad-

ministered, and the mare stood quietly watching the helpers, as if conscious of the need of its offspring, as long as the foal was in her sight ; but the moment it was removed she became violent.

White mentions the case of an old hunting-mare, which ran on the common, and which, being taken very ill, came down into the village, as it were to implore the help of men, and died the night following in the street.

It is a common and not very considerate practice to put ducks' eggs under a broody hen ; and it must be confessed that, generally speaking, a more numerous and healthy lot of ducklings are hatched than when the domestic duck herself sits upon them. For she is apt to be careless, and—haunted, perhaps, by some notions of her original free state, and of the fresh nest amid the flags and herbage of the river-side—frequently will not sit close in confinement. But no bird sits closer or better than the common wild-duck, or brings out more numerous and vigorous young. Nor are there wanting instances, especially about mills and farms near some running stream or lake, of the domestic duck sitting as close and unweariedly as the most persevering hen. In many homesteads, however, which are distant from rivers or brooks, the terrestrial foster-mother is preferred ; and when the young ones are hatched, the moment they see the pond, in they all go, to the unspeakable distress of the hen, which remains clucking and crying on the edge, using every call and gesture in her power to rescue them from the destruction which she thinks must be their portion ; nay, the distracted parent will in her agony sometimes actually take water at the risk of her own life to preserve, as she thinks, theirs. All this time the ducklings are swimming about with the utmost complacency, catching flies and amusing themselves in the element to which their unaided instinct has led them in spite of the indignant remonstrances of their foster-mother,

and the obstacles which she opposes to their indomitable will.

It was thought advisable in our poultry-yard to adopt the plan of raising ducklings under a hen ; but in order to lessen the amount of suffering, one particular hen was selected for this office as long as she was fitted for the purpose of incubation. The first year was, of course, a sore trial ; but experience, and that modification of reason to which I have above alluded, had their effect ; and, in the subsequent years, she would lead her palmipede brood to the water, calmly see them launch out on its surface, and remain quietly dusting herself on the dry sunny bank with the utmost unconcern. She was a buff-coloured hen of the Dorking breed, and more than once brought out two broods of ducklings in the same year.

Birds, in a domesticated or semi-domesticated state, like other parents of a higher grade, appear to derive pleasure from exhibiting their hopeful offspring so as to attract observation and admiration.

On the 10th of April last, in an early walk through St. James's Park, I saw on the gravel by the water's edge on the south side, two black swans, which had brought over their two newly-hatched, grey, downy powder-puffs of nestlings, with black bills and feet, from the island where they had first seen the light, as if to show them in their pride to the passers-by, of whom a little crowd had collected round them, apparently to the great satisfaction of the parents. To be sure, they had the lake to retreat to, if any danger had threatened. After standing to be admired a short time, the whole party again took water and rowed over to their island. In the afternoon, between five and six, I saw the old birds close to the bank, but without their young ones. They had hatched three ; but the ' gander,' as the keeper somewhat irreverently called the male swan, trod on one in the nest and killed it. I

say 'irreverently,' for as among barn-door fowls we have a cock and a hen, we have, among swans, a cob and a pen.

April 22.—A friend told me on Saturday that he had seen a swallow in Kent on the 18th. I looked out to-day over the water in St. James's Park, but saw none; and I was in the Regent's Park yesterday without meeting with a single *hirundo* of any species. My friends, the black swans, have contrived to kill another cygnet, with their great splay-feet, probably, and now go about with one only. Very proud of it they seem to be. By the way, it appears that the Canada geese,* the ganders especially, are most destructive to the nestlings of other birds during the breeding season. The gander will not suffer anything to live, if it can help it, in the neighbourhood of its nest. Ducklings, goslings, cygnets, all fall before its violence. A pair are sitting in the Park, and the gander annihilates every young bird of any other species that appears on his domain, and comes within his power. Great fears are now entertained for a fine brood of fourteen young wild-ducks just hatched in his vicinity.

When this meets the eye of those who read such trifles, nidification may be considered, with few exceptions, as being over for this year. How varied are the nests, from the merest rough collection of straw and litter to the elegant and elaborate little domicile now before me :—

What nice hand,
With twenty years' apprenticeship to boot,
Will make me such another.

It is the work of a goldfinch ; a labour of love executed in secret. How carefully constructed, with what an eye to the colour of surrounding objects, so that there may be the least risk of discovery !

* *Anser Canadensis* ; *L'Oie à cravate* of the French.

The expedients to which small birds have recourse to thwart detection when they are conscious that they are surprised in the act of bearing materials for making their nests, or conveying food to their young, are amusing.

On Easter Sunday, as I was passing along the foot-way that borders the National Gallery—(thank *Punch* and *The Times*, the Vernon collection is at last to be disinterred from the vault to which a grateful Government had consigned it)—I saw a sparrow fly down to the neighbouring hackney-carriage-stand and pick up a very long straw, with which it flew, with some labour, towards the building. The long, streaming straw, attracted the attention of some of the pedestrians, who stopped and looked at the loaded little bird, which was directing its flight towards the portico of the gallery; but, finding its motions watched, it turned short round and pitched with its straw on one of the window-sills, and the people then passed on. Presently it flew again towards the portico; but the people again stopping and looking—for if one passenger stops and looks up in a great London thoroughfare, you have in a very few moments an increasing crowd—it flew back to another window; and the second lot of gazers went their way. The little bird then started again with its straw towards one of the same pillars, and, cutting round it, so as to avoid prying eyes as much as possible, bore it to the capital of one of the pilasters and disappeared, straw and all, into the snug nook, made by a part of the projecting ornament, which it had chosen as the place for making its nest. The wary bird was not disposed to let an inquisitive public know the way to its home. On many other occasions I have observed these and other birds remain waiting about for a long time with nest-materials and food in their bills when they have perceived that I was watching them; but the moment I turned my head, they were off with their burden to the nest. This would not be worth mentioning,

were it not so difficult to find persons who will use their eyes to some purpose.

The careful preparation and anxious concealment manifested by the generality of birds in the process of nidification can only be equalled by the ardour of the consequent incubation. But there is no rule without an exception, as we shall presently see.

In the Book of Job* we find mention made of the ostrich:—

Which leaveth his egges in the earth, and maketh them hote in the dust,

And forgetteth that the foote might scatter them, or that the wilde beast might brake them.

Hee sheweth himselfe cruell unto his yong ones, as they were not his, and is without feare, as if he travailed in vaine.

For God hath deprived him of Wisedome, and hath given him no part of understanding.

The following note is appended to v. 17:—

They write that the ostrich covereth her egges in the sand, and because the countrey is hote, and the sun still keepeth them warme, they are hatched.

The masculine gender is used in the text, and we know that in a kindred genus, the emeu, or New Holland cassowary,† the eggs are hatched by the male. But there can be no doubt that ostriches incubate, though during the heat of the day the parent birds may leave them to the high temperature of the climate in order to avoid a degree of heat which might be fatal to the vitality of the eggs. Captain Lyon states that all the Arabs agree respecting the manner in which these birds sit on their eggs. They are not, he says, left to be hatched by the warmth of the sun, but the parent bird forms a rough nest, in which she covers from fourteen to eighteen eggs, and regularly sits on them in the same manner as the

* Chap. xxxix. v. 17 *et seq.*; Barker's Bible, 1613.

† *Dromaius Novæ Hollandiæ.*

common fowl does on her chickens; the male occasionally relieving the female. It is during the breeding season, he adds, that the greatest numbers are procured, the Arabs shooting the old ones while on their nests. By the way, Captain Lyon remarks, that at all the three towns, Sockna, Hoon, and Wadan, it is the custom to keep tame ostriches in a stable, and in two years to take three cuttings of their feathers. He imagined, from what he saw of the skins of ostriches brought for sale, that all the fine feathers sent to Europe are from tame birds; the wild ones being generally so ragged and torn, that not above half-a-dozen good perfect ones can be found. The white feathers are what Captain Lyon alludes to; the black ones, being shorter and more flexible, are generally good.

Various statements have been made as to the number of eggs, and from eight to ten have been mentioned as found together. The latter is the number assigned by Le Vaillant to a single female. But he disturbed one from a nest containing thirty eggs, surrounded by thirteen others. He watched this nest, and observed four females in succession sit upon them during the day. This appears to have been a sort of nest in copartnership, such as turkeys and other incubating birds that make their nests upon the ground will sometimes enter into.*

* In the county of Somerset, the mowers found, near an outlying barn where poultry were in the habit of picking about, a partridge's nest, with several unhatched partridge's eggs and the shells of three eggs of the common hen, with all the appearances indicative of their having contained chickens. Afterwards, when they were cutting wheat, a brace of partridges and three common chickens got up and flew off; but the chickens could not keep up with the partridges, and were caught by the mowers. These were evidently the produce of the hen's eggs, which must have been laid by the hen in the nest of the partridge, the hen having been attracted most probably by the sight of the partridge's eggs. Now it is well known that the incubation of a partridge is of

The nest of the ostrich appears to be nothing more than a pit of sand, some three feet in diameter, the sand being thrown up so as to form a raised edge round it.

From this modified and somewhat loose degree of incubation we pass to the exception to the general rule to which we have above alluded.

The visitors to the garden of the Zoological Society of London, in the Regent's Park, may see a plain-looking, sombre bird, with a considerable share of tail, of a size between a common fowl and a curassow,* walking and picking about as if it were looking for something it ought to find but cannot. It is, at present, in the great aviary on the south side, on the right after entering the gate from the road. This is the *brush turkey*† of the colonists of New Holland, the *weelah* of the aborigines of the Namoi. If any one should inform an uninitiated visitor that the bird before him never sits upon its eggs, but plants them in a hotbed, as a man might plant cucumber and melon seeds, he would be taken for the most notorious fabulist since the days of Bidpai. If he should enlighten the neophyte farther, and instruct him that the birds collect the materials for this hotbed themselves, and bide their time till the fermentation has reached the

longer duration than that of a hen. When, therefore, the common hen's eggs were hatched, the hen partridge must have hurried to the conclusion that the rest of the eggs (her own) were bad, and that it was of no use to waste further time upon them; whereupon she went away with her foster-chickens, leaving her own eggs to their fate.

Here we have an instance of misled instinct. Nor is the facility with which the chickens appear to have accommodated themselves to the wild habits of their foster-parents, so far as their powers would permit, uninstructional. They were in a fair way of returning to savage life; and, if a similar accident had happened in an uninhabited or uncultivated country, who shall say what results might have sprung from the connexion?

* *Craz*.

† *Talegalla Lathamii* (Gould).

proper point, till, like the patent incubator, it is fit for hatching the eggs, he would stand a very good chance of being set down as a member of the great family of Munchausen, of adventurous and marvellous memory. But nothing is more true.

The *brush turkey* belongs to a family of birds—or, if you wish to be hypercritical, learned reader, a sub-family—which never incubate, but having collected vegetable materials—which they know will heat to a proper point without, like an ill-saved hayrick, bursting out into combustion, or getting up into a sullen baking point, which would be equally destructive of the vital principle—leave their eggs to the genial warmth of this half-natural, half-artificial mother.

The *genera* of this family at present known are *Tallegalla*, *Leipoa*, and *Megapodius*, all inhabitants of that marvellous country which seems to be a remnant still left to give us a notion of a very ancient state of this planet.

Tallegalla Lathamii has been in its time a sore puzzle to systematists. More than one have made it a vulture, and have seized upon it as such to fill up a blank in a favourite system. It is no such thing. If you wish to see a perfect image of the bird, possess yourself of Mr. Gould's admirable work on *The Birds of Australia*. He has the merit of first clearing up this dark chapter in ornithology, and any amusement or instruction which may be derived from the perusal of this portion of this paper is due to him. He is of opinion that the natural situation of the bird is among the rasorial forms, and that it is one of a great family peculiar to Australia and the Indian Islands, of which *Megapodius* constitutes a part; and in confirmation of his view he notices the two deep emarginations of the sternum, so truly characteristic of the gallinaceous race. He is right.

The upper surface of the adult male, its wings and tail,

are of a blackish-brown ; but, on the under surface, the feathers are blackish-brown at the base, going into silver-grey at the ends. The skin of the head and neck is of a deep pink, verging on red, and thinly sprinkled with short hair, like feathers of a blackish-brown. His wattle is of a bright yellow, tinged with red where it joins the red of the neck. His bill is black, and the irides of his eyes and his feet are brown.

In size the female is about a fourth less than the male, but very similar in colour, only her wattle is less extensive.

Size of well-developed specimens, nearly that of a turkey.

Now for the habits of this extraordinary feathered biped.

The brush-turkey is gregarious, going in small companies, and very wary and suspicious. Like the pheasants and some others of the gallinaceous tribe it is a cunning runner, and often escapes through the mazes of the brush. The native dog is their great enemy, and when this destroyer is upon them, and, indeed, whenever they are hard pressed, if the opportunity offers, they all spring upon the lowest bough of a tree, leaping from branch to branch till they reach the top. There they either perch or take wing to another part of the cover. When undisturbed, they seek the sheltering branches of trees during the day. The sportsman knows this, and, taking advantage of their fatal siesta, knocks them over one after the other ; for they take no warning from the fate of their companions, remaining to be shot at till all are bagged, or the sportsman is tired of plying his gun.

In all this there is nothing very extraordinary, surely?

Certainly not, observing sir, or madam ; but patience.

It is in the reproduction of the species that the anomalous proceedings of the bird are manifested. Collecting

gradually a quantity of decaying vegetables, the bird makes a hotbed. Several weeks are patiently employed in bringing the materials together, till, at length, a mound, consisting of a congeries of from two to four cart-loads, is formed. But it must not be considered as the labour of an individual, or of a pair, for many join in the work. When once established, a forcing-bed of this description does duty for many years; that is, the same site is resorted to, and as the lower part decomposes the birds superadd an additional supply previous to depositing their eggs.

In the construction of the most elaborate of bird's-nests the bill is the principal instrument of action, the feet performing a very subordinate part in the operation. In the instance before us the case is reversed. The foot is the agent in collecting and depositing; the bill is not used for those purposes at all. The bird grasps a quantity in its foot, throwing it backwards to the common centre of deposit. The surface of the adjoining ground is thus cleared for a considerable distance so completely that hardly a leaf or blade of grass is left. When this pyramidal vegetable mound has had a sufficient time to heat, so as to be of the proper temperature, the large eggs are inserted, not side by side as in ordinary cases, but planted at regular distances from each other, some nine or twelve inches apart, perfectly upright, and with the large end downwards, each egg being buried at nearly an arm's depth. They are then covered up and left till they are hatched.

John Hunter found the temperature of a sitting hen to be 104° of Fahrenheit's thermometer, and ascertained the heat to be the same when the ball of the instrument was placed under her. Having taken some of the eggs from under the same hen, when the chick was about three-parts formed, he broke a hole in the shell, and introducing the ball of the thermometer he found that the

quicksilver rose to $99\frac{1}{2}^{\circ}$. In some that were addled he found the heat not so high by two degrees; so that, as he observes, the life in the living egg assisted in some degree to support its own heat. We have no statement of the heat of these procreant mounds at hatching-time, but the tallegalla, without any aid but that which comes from above, knows exactly the time when they have arrived at that degree of temperature necessary for hatching the eggs, and which, probably, closely approximates to that which Hunter found to prevail in the sitting hen.

Mr. Gould was credibly informed, both by natives and settlers living near the haunts of these birds, that it is not unusual to obtain nearly a bushel of eggs at one time from a single heap, and delicious eating they are said to be. There seems to be some discrepancy as to the degree of care manifested by the parents for their oviplantation, some of the natives stating that the females are constantly in the neighbourhood of the heap about hatching-time, frequently uncovering the eggs and covering them up again, as if for the purpose of assisting the young birds that may have broken their prison, whilst others informed Mr. Gould that the eggs are merely deposited, and the young left to force their way out without assistance.

If the latter information be correct, the question arises as to how the newly-hatched birds are sustained; and Mr. Gould observes that, in all probability, as Nature has adopted this mode of reproduction, she has also gifted the young birds with the power of sustaining themselves from the earliest period; and he remarks, that the great size of the egg would lead to this conclusion, since in so comparatively large a space as that included in the area of one of these eggs, it is reasonable to suppose that the bird would be much more developed than is usually found to be the case in eggs of smaller

dimensions. Mr. Gould obtained some confirmation of this opinion; for, in searching for eggs in one of the mounds, he discovered the remains of a young bird, apparently just excluded from the shell, but it was clothed with feathers, not with down, as is usually the case. The upright position of the eggs, he observes, tends to strengthen the opinion that they are never disturbed after they are deposited, for it is well known that the eggs of birds which are placed horizontally are frequently turned during incubation. This may be seen by any one who will closely watch a common sitting hen. Mr. Gould was almost too late for the breeding season, but he saw several of the heaps, both in the interior and at Illawarra. They were always in the most retired and shady glens, and on the slope of a hill, the part above the nest being scratched clean, while all below remained untouched, as if the birds had found it easier to convey the materials down than to throw them up. Mr. Gould found only one perfect egg, but he saw the shells of many from which the young had escaped in the position above described. At Illawarra he found them rather deposited in the light vegetable mould than among the leaves, which were accumulated in a considerable heap above them.

The comparatively large size of the eggs has been alluded to. Mr. Gould describes them as perfectly white; of a long oval form, three inches and three-quarters long, by two inches and a half in diameter. He saw a living specimen in the garden of the late lamented Mr. Alexander M'Leay, at Sydney, which had for two successive years collected an immense mass of materials, as if it had been in its native woods. Wherever it was allowed to range—borders, lawn, and shrubbery—presented an appearance that would have satisfied the most fastidious lover of garden neatness, for they looked as if they had been regularly swept, from the bird having scratched

everything that lay upon the surface to add to the mound, which was about three feet high and ten feet over. On placing his arm in it, Mr. Gould found the heat to be about 90° or 95° Fahr. He saw the bird, which was a male, strutting about with proud and majestic port, 'sometimes parading round the heap, at others perching on the top, and displaying its brilliantly-coloured neck and wattle to the greatest advantage: this wattle it has the power of expanding and contracting at will; at one moment it is scarcely visible, while at another it is extremely prominent.'

Here was an instance of the uncontrollable power of instinct. This solitary bird perseveringly continued to construct its mound and keep it ready for the mate, which it was never destined to see. It was unfortunately drowned, and then its sex was discovered upon dissection.

Leipoa ocellata, the *ngow* of the aborigines of the lowland, the *ngow-oo* of those of the mountain districts of Western Australia, and the *native pheasant* of the Western Australian colonists, is the next form of this anomalous family that claims our notice.

The head and crest are of a blackish-brown hue, and a dark ashy grey pervades the neck and shoulders. From the chin to the breast the forepart of the neck is covered with black lanceolate feathers, with a white stripe down the centre of each. Three distinct bands of greyish-white, brown, and black, mark the back and wings, the marks taking an ocellated form, especially on the tips of the secondaries. The primaries are brown, and have their outer webs pencilled with two or three zigzag lines near their tips. The whole of the under surface is light buff, and the tips of the flank feathers are barred with black. The blackish-brown tail has a broad buff tip. The bill is black, and the feet are blackish-brown.

This species lays its eggs in a mound of sand, about

three feet in height, which both sexes have contributed to raise, and to form which the natives say that the birds scratch up the sand all around for many yards. The inside of the mound presents alternate layers of dried leaves, grasses, &c.; among which twelve eggs, or more, are deposited, and covered up by the birds as they are laid, till the process is complete, when the sandy mound presents the appearance of an ants' nest. The eggs, which are about the size of three of a common fowl, white, slightly tinged with red, are thus left to be hatched by the heat of the sun's rays, the vegetable materials retaining sufficient warmth to keep them at a proper temperature during the night; for the eggs are deposited in layers, and no two eggs are suffered to lie without an intervening division.

The hillocks are robbed by the natives two or three times in the season, and they conclude that the number of eggs in a mound are many or few by the quantity of feathers scattered about. If there be abundance of feathers it is a sign that the hillock is full, and they immediately open it and take the whole deposit. The hen then lays again, and when her complement is complete is again robbed, when she will frequently lay a third time. In the mounds ants are often found as numerous as in an ant-hill; and sometimes that part of the hillock which surrounds the lower portion of the eggs becomes so hard, that a chisel is necessary to get them out.

Captain Grey, of the 83rd regiment, informed Mr. Gould that he had never met with these nest-mounds except where the soil was dry and sandy, and so thickly covered with a dwarf species of *Leptospermum* as to render it almost impossible for a traveller to force his way through if he strays from the native paths. In those close scrubby woods small open glades occur occasionally, and there he found the *ngow-oo's* nest, consisting of a

heap of sand, dead grass and boughs, three feet in height, nine in diameter, and sometimes larger.

In size this beautiful bird is less than the brush turkey. It keeps much on the ground, seldom taking to a tree if not closely pursued. When hard pressed it will often run its head into a bush, and be there taken. The food, like that of *talegalla*, consists principally of seeds and berries, and it utters a mournful note, very like that of a pigeon, but more inward in sound.

But the most remarkable of this extraordinary group is the *Ooeregoorga* of the aborigines of the Coburg Peninsula, known to the colonists of Port Essington as the *jungle-fowl*.*

The head and crest of this great-footed bird are deep cinnamon brown, the hue of the neck and all the under surface is dark grey. The back and wings are cinnamon brown, and the upper and under tail-coverts are dark chesnut brown. The general colour of the irides is dark brown, but in some individuals light reddish brown. The reddish-brown bill is bordered with yellow edges. The legs and feet bright orange, and the size about that of the common fowl.

When Mr. Gilbert, who assisted Mr. Gould in collecting the materials for his grand work on the Australian birds, arrived at Port Essington, numerous great mounds of earth were pointed out to him by some of the residents—who probably belonged to the Society of Antiquaries—as being the tumuli of the aborigines. The natives told him not to listen to these wise men, and assured him, that so far from being the burying-places of the human biped, they were the nests in which the eggs of the *ooeregoorga* were hatched. No one in the settlement believed a story that contradicted all the usual experiences of the incubation of birds, and when the natives

* *Megapodius tumulus*.

brought in some of the large-sized eggs in confirmation of their statement, they were treated as lawyers sometimes are when they try to make their case too good, and the doubt previously entertained was strengthened. But Mr. Gilbert happened to know something of the habits of *Leipoa*, so he took to himself a knowing native, and about the middle of November proceeded to Knocker's Bay, a portion of Port Essington harbour very little known, but where he had been told a considerable number of these birds might be seen. He landed close to a thicket, and had proceeded but a short distance from the shore when he beheld a mound of sand and shells, with a slight mixture of black soil, whose base rested on the sandy beach, a few feet above high-water mark. The large yellow-blossomed *Hibiscus* enveloped this conical tumulus, which was some five feet high, and twenty feet in circumference at its base. He turned to his native, and asked what it was.

‘Oregoorgā rambal.’ (Jungle-fowl's house or nest.)

Up scrambled Mr. Gilbert, and sure enough found a young bird in a hole about two feet deep, apparently but a few days old, and lying on a few dry leaves. The native protested to Mr. Gilbert that it would be of no use to hunt for eggs, as there were no traces of the old birds having been lately there, so our collector secured the nestling, placed it in a good-sized box with a sufficiency of sand, and fed it with bruised Indian corn, which it took rather freely; but it was wild and intractable, and on the third day it contrived to escape from its prison. But while it remained in the box it was incessantly employed in scratching up the sand into heaps, and although it was not larger than a small quail, the vigour and rapidity with which it threw the sand from one end of the place of its confinement to the other was quite surprising. Poor Mr. Gilbert got but little sleep while it was in his custody, for it was so restless at night that it

kept him awake by the noises it made in endeavouring to gain its liberty. Only one foot was employed in scratching up the sand, and when the bird had grasped a footful it threw the sand behind it with small exertion, and without shifting its standing position on the other leg. This exertion seemed to Mr. Gilbert to proceed from mere restlessness, and a desire to use its powerful feet, without having much, if any, connexion with feeding; for Mr. Gilbert never detected the bird in picking up any of the Indian corn which was mixed with the sand while thus employed.

Eggs were continually brought to Mr. Gilbert; but he had no opportunity of seeing them taken from the ground till the commencement of February, when, on another visit to Knocker's Bay, he saw them exhumed from a depth of six feet, in one of the largest mounds which he had seen. In this mound the holes ran down in an oblique direction, from the centre of the hillock towards the outer slope, so that although the eggs were six feet deep from the top, they were not more than two or three from the side. Mr. Gilbert was informed that the birds lay only a single egg in each hole, and that, after the egg is deposited, the earth is immediately thrown down lightly until the hole is filled up. Then the upper part of the mound is smoothed and rounded over. The top and sides of the mound betray the recent excavations of the bird, for the distinct impressions of its feet are there left, and the earth is so lightly thrown over, that the direction of the hole is easily ascertained by thrusting in a slender stick, the ease or difficulty of the penetration indicating the length of time that has elapsed since the operations of the bird. But to reach the eggs is no easy task. The natives dig them out with their hands alone, making only sufficient room to admit their bodies, and to throw out the earth between their legs. By grubbing thus with their fingers, they are enabled to follow the direction of

the hole with greater certainty; and it will, sometimes at a depth of several feet, turn off sharply at right angles, its direct course being thwarted by a clump of wood or some other obstacle. Persevering as the savage is, his patience is often sorely tried. Upon the occasion of extracting these two eggs the native dug down six times successively, to a depth of six or seven feet at least, without finding an egg, and came up so exhausted that he refused to try again. But Mr. Gilbert's anxiety to verify the statement made to him was now completely roused, and by the offer of an additional reward he induced the grubber to try again. The seventh trial was crowned with success; and Mr. Gilbert's gratification was complete when the native with pride and satisfaction held up an egg, and after two or three more attempts displayed a second. 'Thus proving,' adds worthy Mr. Gilbert, 'how cautious Europeans should be of disregarding the narrations of these poor children of nature, because they happen to sound extraordinary, or different from anything with which they were previously acquainted.'

In another mound Mr. Gilbert, with the aid of his native, obtained an egg from the depth of about five feet, after excessive labour. This egg was in a perpendicular position, and the holes in this hillock—which rose to the height of fifteen feet, was sixty in circumference at the base, and, like the majority of those he had seen, was so enveloped amid trees of thick foliage as to preclude the possibility of the sun's rays penetrating to any part of it—commenced at the outer edge of the summit and ran down obliquely to the centre. This mound felt quite warm to the hands.

Now comes the question, How do the young birds effect their escape from the tomb, where they are literally buried alive?

This seems to be a mystery. Some natives told Mr.

Gould that they emerged without aid: others declared that the old birds, when the fulness of time was come, scratched down to their offspring, and set them free.

Mr. Gilbert found this megapode confined almost exclusively to the dense thickets near the sea-beach; nor does it appear to be met with far inland, except up the banks of creeks. The birds go in pairs or singly, feeding on the ground, on roots for the most part, which the powerful claws of their great feet enable them to scratch up, and on seeds, berries, and insects, especially the large coleopterous kinds of the latter. They are not easily procured, and though the whirring of their wings as they fly away is often heard by those who approach their haunts, the birds themselves are seldom seen. The flight is heavy, and does not seem capable of being long sustained. When first disturbed the jungle-fowl invariably makes for a tree, and as soon as it there alights, stretches out its head and neck in a straight line with the body, and remains motionless in that attitude. When thoroughly roused and alarmed it flies horizontally and laboriously for about a hundred yards, with its legs hanging down. Mr. Gilbert did not hear any note or cry; but the natives described and imitated it, and according to them it clucks much in the fashion of a common domestic fowl, the cluck ending in a peacock-like scream. He observed that the birds continued to lay from the end of August to March, when he left that part of the country, and, if the natives are to be believed, an interval of only four or five months, including the driest and hottest portion of the year, occurs between their breeding seasons. Mr. Gilbert remarks that the composition of the mound seems to influence the colouring of a thin epidermis, with which the eggs are invested, and which readily chips off, showing the shell to be white. Thus eggs deposited in a black soil are externally of a dark reddish brown; those placed in sandy hillocks near the beach present a

dirty yellowish-white hue. They differ in size considerably; but all are of the same form, with both ends equal. The average size may be taken at three inches five lines long by two inches three lines broad.

The geographical distribution of this singular group of birds is not confined to Australia, but extends from the Philippine Islands through those of the Indian Archipelago to Australia.

The same Fauna that exhibits the anomalous proceedings of the brush turkey, the native pheasant, and the megapode, and the rude congeries of materials in which they plant their eggs, leaving them there to be hatched by vegetable fermentation and solar heat, as the common snake consigns *her* eggs to the dunghill, presents the most curious examples of bird architecture hitherto discovered. The history of the elegant artificers of these structures has more the semblance of an Arabian tale than a sober statement of fact. The bower-birds* of Australia display, in the erection and decoration of their edifices for assembly and halls of amusement, an ingenuity and taste that place them far beyond any others of their race with which we are acquainted.

Their constructions and collections—for they are most ardent, assiduous, and indefatigable collectors—had attracted the attention of travellers, who were puzzled as to what cause they could attribute the phenomena presented to them occasionally in their journeys. To Mr. Gould, who has dissipated the clouds which obscured so many of the Australian animals, we are indebted for an elucidation of this most curious mystery. He watched the builders, obtained two of the bowers complete, and with his usual liberality, and not without considerable difficulty, placed one in our national museum and the other in that of Leyden.

* Genera, *Ptilonorhynchus* and *Chlamydera*.

The bower-like structures from which the birds take their name first came under the notice of Mr. Gould at Sydney. Mr. Charles Coxen had presented an example to the museum there as the work of the satin bower-bird. With his usual energy, Mr. Gould at once determined to leave no means untried for ascertaining every particular relating to this peculiar feature in the economy of the bird; and on visiting the cedar-brushes of the Liverpool range, he discovered several of these bowers or playing-places. He found them usually under the shelter of an overhanging tree in the most retired part of the forest, differing considerably in size, some being a third larger than that represented in Mr. Gould's admirable picture (for the illustrations in this, as well as in many of his other works, are not mere figures—they are pictures), whilst others were much smaller. He shall now speak for himself:—

The base consists of an extensive and rather convex platform of sticks firmly interwoven, on the centre of which the bower itself is built; this, like the platform on which it is placed and with which it is interwoven, is formed of sticks and twigs, but of a more slender and flexible description, the tips of the twigs being so arranged as to curve inwards and nearly meet at the top. In the interior of the bower the materials are so placed that the forks of the twigs are always presented outwards, by which arrangement not the slightest obstruction is offered to the passage of the birds. The interest of this curious bower is much enhanced by the manner in which it is decorated at and near the entrance with the most gaily-coloured articles that can be collected, such as the blue tail-feathers of the Rose-hill and Pennantian parrots, bleached bones, and shells of snails, &c.; some of the feathers are stuck in among the twigs, while others, with the bones and shells, are strewn about near the entrances. The propensity of these birds to pick up and fly off with any attractive object is so well known to the natives, that they always search the runs for any small missing article, as the bowl of a pipe, &c. that may have been accidentally dropped in the brush. I myself found at the entrance of one of them a small neatly-worked stone tomahawk, of an inch and a-half in length, together with some slips of blue cotton rags, which the birds had doubtless picked up at a deserted encampment of the natives.

Mr. Gould goes on to observe that the purpose for which these curious bowers are made is not yet, perhaps, fully understood. He is certain that they are not used as a nest, but as a place of resort for many individuals of both sexes, which, when there assembled, run through and around the bower in a sportive and playful manner, and that so frequently, that it is seldom entirely deserted.

The proceedings of these birds (adds Mr. Gould) have not been sufficiently watched to render it certain whether the runs are frequented throughout the whole year or not; but it is highly probable that they are resorted to as a rendezvous or playing-ground at the pairing-time, and during the period of incubation. It was at this season, as I judged from the state of the plumage and from the internal indications of those I dissected, that I visited these localities; the bowers I found had been recently renewed; it was, however, evident, from the appearance of a portion of the accumulated mass of sticks, &c. that the same spot had been used as a place of resort for many years. Mr. Charles Coxen informed me, that after having destroyed one of these bowers and secreted himself, he had the satisfaction of seeing it partially reconstructed; the birds engaged in this task, he added, were females.*

Such are the bowers constructed by the satin bower-bird, (*Ptilonorhynchus holosericeus*, Kuhl,) the *cowry* of the aborigines of the coast of New South Wales. The plumage of the adult male is deep, shining, blue-black, well justifying that part of its name which likens it to satin, except the primary wing-feathers, whose deep black more resembles velvet; and the wing-coverts, secondaries, and tail-feathers, which are also of a velvety black, tipped with lustrous blue-black. The eyes are of a light cærulean blue, with a circle of red round the pupil. The bill is of a bluish horn-colour, graduating into yellow at the tip, and the legs and feet are yellowish-white.

The head and all the upper surface of the female are greyish-green, the wings and tail sulphur brown. The

* *Birds of Australia*. By J. Gould, F.R.S. &c. Published by the Author, 20, Broad Street, Golden Square.

same tints prevail on the under surface as on the upper, but are much lighter, with a tinge of yellow, and each feather of the under parts has a scale-like appearance, produced by a crescent-shaped dark-brown border at its extremity. The irides are of a deeper blue than those of the male, and there is only an indication of the red ring. The bill is of a dark horn-colour; and the feet are of a yellowish-white hue, tinged with horn-colour.

The young males closely resemble the females, with this difference, that the hue of the under surface is of a more greenish yellow, and the crescent-shaped markings more numerous. The irides are dark blue, the feet olive brown, and the bill blackish olive.

These birds, the male being in its transition-suit, may be seen at the garden of the Zoological Society, where they have a bower, and where I have had the pleasure of watching them. But I must break off for the present, though much more remains to be noticed with regard to this most interesting group, and other temptations crowd upon my pen. The hippopotamus—thanks to his powerful highness the Viceroy of Egypt, who saith to a man ‘Go, and he goeth;’ and to good, zealous, indefatigable, disinterested Mr. Murray—is delighting multitudes of eager spectators, who crowd to the Regent’s Park to see this most healthy, good-humoured, rollicking, pachydermatous baby of five hundred pounds’ weight, that has come from a distance of five thousand miles to see and be seen: for he appears to be as pleased with his visitors as they are with him. The thylacines—shapes such as one sees in dreams—as yet so shy and wild that they dash with horror from the sight of a human face, and remain sulkily in their dormitory, are arrived to add to our notions of Australian wonders. The Egyptian snake-charmers are come.

July, 1850.

CHAPTER VIII.

ELEGANT and ingenious as are the structures and collections of the satin bower-bird, the species of the allied genus *Chlamydera* display still greater architectural abilities, and more extensive collective and decorative powers.

The spotted bower-bird* is an inhabitant of the interior. Its probable range, in Mr. Gould's opinion, is widely extended over the central portions of the Australian continent; but the only parts in which he observed it, or from which he procured specimens, were the districts immediately to the north of the colony of New South Wales. During his journey into the interior he saw it in tolerable abundance at Brezi, on the river Mokai, to the northward of the Liverpool plains; and it was also equally numerous in all the low scrubby ranges in the neighbourhood of the Namoi, as well as in the open brushes that intersect the plains on its borders. Mr. Gould is gifted with the eye of an observer; but, from the extreme shyness of its disposition, the bird generally escapes the attention of ordinary travellers, and it seldom allows itself to be approached near enough for the spectator to discern its colours. Its 'harsh, grating, scolding note,' betrays its haunts to the intruder; but, when disturbed, it seeks the tops of the highest trees, and generally flies off to another locality.

Mr. Gould obtained his specimens most readily by

* *Chlamydera maculata* (Gould).

watching at the water-holes where they come to drink ; and on one occasion, near the termination of a long drought, he was guided by a native to a deep basin in a rock where water, the produce of many antecedent months, still remained. Numbers of the spotted bower-birds, honeysuckers, and parrots, sought this welcome reservoir, which had seldom, if ever before, reflected a white face. Mr. Gould's presence was regarded with suspicion by the winged frequenters of this attractive spot ; but while he remained lying on the ground perfectly motionless, though close to the water, their wants overpowered their misgivings, and they would dash down past him and eagerly take their fill, although an enormous black snake was lying coiled upon a piece of wood near the edge of the pool. At this interesting post Mr. Gould remained for three days. The spotted bower-birds were the most numerous of the thirsty assemblage there congregated, and the most shy, and yet he had the satisfaction of frequently seeing six or eight of them displaying their beautiful necks as they were perched within a few feet of him. He states that the scanty supply of water remaining in the cavity must soon have been exhausted by the thousands of birds that daily resorted to it, if the rains which had so long been suspended had not descended in torrents.

Mr. Gould discovered several of the bowers of this species during his journey to the interior, the finest of which, now in the National Museum, he brought to England. He found the situations of these runs or bowers to be much varied. Sometimes he discovered them on the plains studded with Myalls (*Acacia pendula*), and sometimes in the brushes with which the lower hills were clothed. He describes them as considerably longer, and more avenue-like, than those of the satin bower-bird, extending in many instances to three feet in length. Outwardly they were built with twigs,

and beautifully lined with tall grasses, so disposed that their upper ends nearly met. The decorations were very profuse, consisting of bivalve shells, skulls of small animals, and other bones.

Evident and beautiful indications of design (continues Mr. Gould) are manifest throughout the whole of the bower and decorations formed by this species, particularly in the manner in which the stones are placed within the bower, apparently to keep the grasses with which it is lined fixed firmly in their places: these stones diverge from the mouth of the run on each side so as to form little paths, while the immense collection of decorative materials, bones, shells, &c. are placed in a heap before the entrance of the avenue, this arrangement being the same at both ends. In some of the larger bowers, which had evidently been resorted to for many years, I have seen nearly half a bushel of bones, shells, &c., at each of the entrances. In some instances, small bowers, composed almost entirely of grasses, apparently the commencement of a new place of rendezvous, were observable. I frequently found these structures at a considerable distance from the rivers, from the borders of which they could alone have procured the shells, and small, round pebbly stones; their collection and transportation must, therefore, be a task of great labour and difficulty. As these birds feed almost entirely upon seeds and fruits, the shells and bones cannot have been collected for any other purpose than ornament; besides, it is only those which have been bleached perfectly white in the sun, or such as have been roasted by the natives, and by this means whitened, that attract their attention. I fully ascertained that these runs, like those of the satin bower-bird, formed the rendezvous of many individuals; for, after secreting myself for a short space of time near one of them, I killed two males which I had previously seen running through the avenue.

The plumage of this species is remarkable. A rich brown pervades the crown of the head, the ear-coverts and the throat, each feather being bordered by a narrow black line; and, on the crown, the feathers are small and tipped with silver gray. The back of the neck is crossed by a beautiful, broad, light, rosy pink band of elongated feathers, so as to form a sort of occipital crest. The wings, tail, and upper surface, are deep brown, every feather of the back, rump, scapularies, and secondaries,

having a large round spot of full buff at the tip. Primaries slightly tipped with white. All the tail-feathers with buffy white terminations. Under parts grayish white. Flank-feathers zigzagged, with faint transverse light brown lines. Bill and feet dusky brown. At the corner of the mouth the bare, thick, fleshy, prominent skin, is of a pinky flesh colour, and the irides are dark brown.

The rosy frill adorns the adults of both sexes ; but the young male and female of the year have it not.

Another species, the great bower-bird,* was probably the architect of the bowers found by Captain Grey during his Australian rambles, and which interested him greatly in consequence of the doubts entertained by him whether they were the works of a bird or of a quadruped,—the inclination of his mind being, that their construction was due to the four-footed animal. They were formed of dead grass and parts of bushes, sunk a slight depth into two parallel furrows, in sandy soil, and were nicely arched above ; they were always full of broken sea-shells, large heaps of which also protruded from the extremity of the bower. In one of these bowers, the most remote from the sea of those discovered by Captain Grey, was a heap of the stones of some fruit, that evidently had been rolled therein. He never saw any animal in or near these bowers ; but the abundant droppings of a small species of kangaroo close to them, induced him to suppose them to be the work of some quadruped.

Here, then, we have a race of birds whose ingenuity is not merely directed to the usual ends of existence, self-preservation, and the continuation of the species, but to the elegances and amusements of life. Their bowers are their ball and assembly rooms ; and we are very

* *Chlamydera nuchalis*.

much mistaken if they are not, like those places of meeting

For whispering lovers made.

The male satin bower-bird, in the garden at the Regent's Park, is indefatigable in his assiduity towards the female ; and his winning ways to coax her into the bower conjure up the notion that the soul of some Damon, in the course of its transmigration, has found its way into his elegant form. He picks up a brilliant feather, flits about with it before her, and when he has caught her eye adds it to the decorations.

Haste my Nanette, my lovely maid,
Haste to the bower thy swain has made.

No enchanted prince could act the deferential lover with more delicate or graceful attention. Poor fellow, the pert, intruding sparrows plague him abominably ; and really it becomes almost an affair of police that some measures should be adopted for their exclusion. He is subject to fits too, and suddenly, without the least apparent warning, falls senseless, like an epileptic patient ; but presently recovers, and busies himself about the bower. When he has induced the female to enter it, he seems greatly pleased ; alters the disposition of a feather or a shell, as if hoping that the change may meet her approbation ; and looks at her as she sits coyly under the over-arching twigs, and then at the little arrangement which he has made, and then at her again, till one could almost fancy that one hears him breathe a sigh. He is still in his transition-dress, and has not yet donned his full Venetian suit of black.

In their natural state, the satin bower-birds associate in autumn in small parties ; and Mr. Gould states that they may then often be seen on the ground near the sides of rivers, particularly where the brush feathers the descending bank down to the water's edge. The male

has a loud, liquid call ; and both sexes frequently utter a harsh, guttural note, expressive of surprise and displeasure.

Geoffrey Chaucer, in his argument to *The Assemblie of Foules*, relates that, 'All foules are gathered before Nature on St. Valentine's day, to chuse their makes. A formell egle beying beloved of three tercels, requireth a yeeres respite to make her choise : upon this triall, *Qui bien aime tard oublie*—'He that loveth well is slow to forget.' The female satin bower-bird in the Regent's Park seems to have taken a leaf out of the 'formell egle's' book ; for I cannot discover that her humble and most obsequious swain has been rewarded for his attentions, though they have been continued through so many weary months ; but we shall never be able entirely to solve these mysteries till we become possessed of the rare ring sent to the King of Sarra by the King of Arabie, 'by the vertue whereof' his daughter understood 'the language of all foules,' unless we can

Call up him that left untold
The story of Cambuscan bold,
Of Camball and of Algersife,
And who had Canace to wife,
That own'd the virtuous ring and glass,
And of the wondrous horse of brass,
On which the Tartar king did ride.

Edmund Spenser, with due reverence for

Dan Chaucer (well of English undefiled),
has indeed done his best to supply the defect,* and has told us that

Cambello's sister was fair Canacee,
That was the learnedst lady in her days,
Well seen in every science that mote be,
And every secret work of nature's ways,
In witty riddles, and in wise soothsays,
In power of herbs and tunes of beasts and birds :

* *Fairy Queen*, book iv. cant. 2 *et seq.*

but we learn from him no more of the ring than 'Dan Chaucer' tells us :—

The vertue of this ring, if ye woll here,
Is this, that if she list it for to were
Upon her thombe, or in her purse it bere,
There is no foule that fleeth under heven
That she ne shall understand his steven,*
And know his meaning openly and plaine,
And answer him in his language againe :

as Canace does in her conversation with the falcon in *The Squier's Tale*. Nor is the 'vertue' of the ring confined to bird intelligence, for the knight who came on the 'steed of brasse,' adds,—

And every grasse that groweth upon root
She shall well know to whom it will do boot,
All be his wounds never so deep and wide.

But we must return from these realms of fancy to a country hardly less wonderful ; for Australia presents, in the realities of its quadrupedal forms, a scene that might well pass for one of enchantment.

To the uninitiated, a commencement of an account in the following manner would look very like a narrative proceeding from the pen of the renowned Captain Lemuel Gulliver.

The country of the marsupiates, or purse-bearers, is of enormous extent, and forms a fifth quarter of the globe. Their young are born in an embryotic state, and conveyed to a comfortable *marsupium* or pouch belonging to the mother, where there are teats, to which these foetuses attach themselves by their mouths. Here they stick, like little animated lumps, till the small knobs which exist at the places where the members ought to be, bud and shoot out into limbs. By and bye these limbs become more and more perfect, and the extremities are completely formed ; till gradually the develop-

* Sound.

ment of the creature reaches its proper proportions, and it is able to go alone. It is right pleasant to behold these curious little animals hopping or running about their parents, and on the most distant approach of danger flying for refuge to the purses of their mothers, where they disappear till it is past, and from whence, if they think they may safely venture, they peep out to see whether the coast is clear.

This, however, is an account of the *marsupialia*, the *Animalia crumenata* of Scaliger, uncoloured by the slightest exaggeration.

New Holland is the head-quarters of these anomalous creatures, and there the great type of the group is placed; nor does it extend far beyond the mainland among the adjacent islands. In America it is scantily represented by the opossums; but neither the colder parts of that country, nor its southern extremity, know it: neither do any representatives of the family occur in Europe, Asia, or Africa. Here, then, we have two far-distant regions presenting themselves as the two points of development of a form which has not spread over other portions of the earth; and, in truth, this, combined with the palæontological researches of Dr. Lund in Brazil, and of our own Owen, relative to the quadrupedal fossil remains of New Holland, is a strong argument for those who look upon these countries as two distinct foci of creation, and as affording examples, among many others, militating against the notion of a unique centre of origin of the animals now in existence.

These marsupials are, as far as observation has gone, of a low grade in the scale of intelligence, and their vocal powers are exceedingly limited. A growl, or a sort of hollow bark, is the nearest approach that is made among them to a completely developed sound, and a half-hissing, half-whizzing, guttural attempt at a cry, is the noise most frequently emitted by them when under the influ-

ence of irritation. I have in vain looked for that attachment to their keepers, and to those who are kind to them, which characterizes the more highly developed quadrumanes and quadrupeds in captivity; and their manners seem to remind the observer of the reptilian rather than of the mammalian class. The wombat's loud serpentine hiss, when provoked, cannot fail to raise this idea in the mind of any generalizing naturalist who hears it; and as for the kangaroo, its larynx absolutely wants the necessary apparatus for producing a vocalized sound, to which the noise that the animal emits bears no resemblance.

The brain in these creatures is in accordance with the stupidity which renders them so unlike those mammiferous quadrupeds in which that organ exhibits a more advanced state of development. The examination of those marsupials that have fallen under the notice of comparative anatomists, indicates the impossibility of their manifesting those qualities which have so deservedly endeared the dog to man. They have no *corpus callosum*; and, without being very presumptuous, that portion of the brain may be pronounced, upon the authority of those who have not leaped to conclusions, but have humbly and patiently drawn them from a long course of study and experiment, to be the principal seat of memory. This defect at once accounts for the stupidity and want of attachment above alluded to. These marsupials seem to have just as much intelligence as will enable them to perform the animal functions, and no more. One of the thylacines in the Regent's Park, when shut out of its dormitory, spent his time in walking round and round in a narrow circle, without even examining the extent or nature of his place of confinement, or expatiating: no, he went round and round, as if he had not sense to do anything more.

But we must introduce this brute form more particularly to our friends.

Thylacinus cynocephalus, the dog-faced opossum, vulgarly known as the zebra opossum and zebra wolf in Van Diemen's Land, is about the size of a young wolf. The short, smooth, dusky brown hair, is barred on the back, especially at the lower part and on the rump, with some fifteen or sixteen black transverse stripes, broadest on the back, and narrowing as they extend down the sides. Two or more of these zebra-like marks descend down the thighs considerably. The ground colour on the back is of a blackish-grey hue. The tail is long, but not large, nor does it look well-proportioned or symmetrically set on. It has forty-six teeth: eight incisors in the upper jaw and six in the lower, two canines above and two below, and twenty-eight molar teeth, fourteen in the upper jaw and the same number in the lower. There are five toes on each of the fore-feet, and four on each of the hind-feet.

Mr. Harris has described this, the largest of the Australian carnivorous animals, in the *Transactions of the Linnean Society*. He remarks that it utters a short, guttural cry, and appears exceedingly inactive and stupid, having, like the owl, an almost constant motion with the nictitating membrane of the eye. The animal described by him was taken in a trap baited with kangaroo flesh, and lived only a few hours after its capture: in its stomach were found the partly-digested remains of a porcupine ant-eater.*

The native abode of this curious animal is among the caverns and rocks of the deep and almost impenetrable glens near the highest mountains of Van Diemen's Land.

I first clearly saw a pair of these animals fairly out in the light on the 26th May last, in one of the dens appropriated to the carnivorous animals in the Garden of the

* *Echidna aculeata*.

Zoological Society in the Regent's Park. They had been presented to the Society by Mr. Gunn. I had, on a former day, seen them imperfectly by getting into the outer apartment of their den and looking into their dormitory. When fairly exposed, they presented to my eye the images of the most extraordinary animals that I had seen; creatures, I repeat, such as one has beheld in dreams—uncouth, loggerheaded, oddly made up, as if Nature had been trying her 'prentice han' at wolf-making, and as if they belonged to a very ancient state of things in this planet, as all the native Australian quadrupeds look. The clumsy, ill-defined forms of these thylacines have puzzled men to give them a name. 'Wolves,' 'hyænas,' are some of the appellations applied to them by the colonists, who saw a dog-like or wolf-like head on a body striped with marks resembling, in a degree, those of some of the hyænas. It is impossible for a palæontologist to look at them, without fancying that he sees some fossil animal recalled to life; and, indeed, the extinct zoophagous marsupial *Thylacotherium* must, as its name implies, have borne some resemblance to the animals now under consideration. There cannot have been any very wide zoological interval between the forms of the thylacine and of the thylacothere.

The thylacines, like all the true Australian mammals, are strictly marsupial; and the female rejoices in as good a pouch after her kind as the best-provided kangaroo of them all.

And what a beautiful provision this is; how admirably adapted to the region in which the marsupials live, and move, and have their being. Australia is proverbially wanting in rivers, and during a considerable portion of the year the supply of water is very precarious. Most of these quadrupeds drink very little; and the mother, in-

* *Macropus major*.

stead of dragging her young about wearily to look, perhaps in vain, for water, has them comfortably wrapped up in her pouch, and thrives where a fox and her cubs would miserably perish.

The size of the foetus of the kangaroo at the time of birth, together with the mode of its attachment to the nipple of the mother, and other highly interesting particulars, may be collected from the experiments of Mr. Collie, Mr. Morgan, and especially of Professor Owen. From these it appears that the young, as soon as it is born, is removed—by the mother's mouth in all probability—to the pouch, which is kept open by the mother's fore-paws, and there held till it attaches itself to a nipple.

Professor Owen ascertained that the days of gestation in the kangaroo are thirty-nine. In order to accustom the female to the examinations of the pouch, they were commenced at a very early period of gestation, and were continued, till at seven in the morning of the 5th October, 1833, the foetus was discovered in the pouch, attached to the left superior nipple. On the preceding day at the same hour a considerable quantity of the moist brown secretion peculiar to the pouch was noticed, indicating that determination of the blood to that part had commenced, and at different times during that day the female put her head into the pouch and licked off the secretion. When examined at six o'clock in the evening, the only perceptible change in the state of the pouch was a slight increase of the secretion; but none of the nipples exhibited any appearance indicating that she was so soon to become a mother. Closely watched as she was she contrived, however, to elude observation at the actual time of parturition, which took place in the night; nor were there any appearances on the litter or about the fur of the animal indicative of the event.

The little one resembled an earth-worm in the colour

and semi-transparency of its integument, adhered firmly to the point of the nipple, breathed strongly but slowly, and moved its fore-legs when it was disturbed. Its little body was bent upon the abdomen, its short tail tucked in between its hind-legs; and these legs, destined if it had lived to be so gigantically developed, and to execute such enormous bounds, were one-third shorter than the fore-legs; but the three divisions of the toes were distinct. Its whole length from the nose to the end of the tail, when stretched out, did not exceed one inch and two lines.

The Professor was aware that the Hunterian dissections, which may be seen in the preparations exhibited in the noble museum of the Royal College of Surgeons of England, as well as the observations of Mr. Morgan and Mr. Collie, concurred in disproving the theory of a vascular mode of connexion between the mammary foetus and the nipple: but as Geoffroy St. Hilaire had stated that a discharge of blood accompanies marsupial birth, or the detachment of the foetus from the nipple, Professor Owen determined not to neglect the opportunity thus offered, and, on the 9th of October, separated the infant creature from the organ that bound it to life.

The following reasons urged him to this act. First, it would decide the nature of the connexion between the foetus and the nipple. Secondly, it promised to afford the means of ascertaining the mammary secretion at this period. Thirdly, it might show whether so small a foetus would manifest the powers of a voluntary agent in regaining the nipple; and, lastly, the actions of the mother to effect the same purpose would probably be brought under notice.

When the foetus, which retained a firm hold of the nipple, was detached, a small drop of whitish fluid, or serous milk, appeared on the point of the nipple, which had entered the mouth about half a line. This ex-

tremity was of smaller diameter than the rest of the organ, not being yet so compressed by the contracted orifice of the mouth as to form the clavate appearance which it presents at a later period. The poor young one moved its extremities vigorously after it was detached, but made no apparent effort to apply its legs to the integument of the mother, so as to creep along, but seemed to be perfectly helpless with regard to progressive motion. It was deposited at the bottom of the pouch. The mother was then liberated, and carefully watched for an hour.

She immediately exhibited symptoms of uneasiness, stooped down and licked herself, and scratched the outside of her pouch. At last, resting on the tripod formed by her hind-legs and tail, she grasped the sides of the orifice of the pouch with her fore-paws, and, drawing them asunder, as in the act of opening a bag, she put her head into the cavity as far as the eyes, and moved it about in different directions. She never meddled with the pouch when she was in a recumbent posture; but when apparently urged by uneasy sensations, she rose and repeated the operation of drawing open the bag and inserting her muzzle, keeping it there sometimes for half a minute. Professor Owen never observed her put her fore-legs into the pouch; they were invariably used to open it. When she withdrew her head, she generally finished by licking the orifice of the pouch and swallowing the secretion. After repeating the act above described some dozen times, she lay down and seemed to be at ease. When she had remained quiet for about half an hour she was again examined, and the young one was found, not at the bottom of the pouch, but within two inches of the nipple, breathing strongly and moving its extremities irregularly as before. The Professor made an unsuccessful attempt to replace it on the nipple, and the mother was then released. Two days afterwards the

pouch was found empty. Every portion of the litter was carefully searched, but no traces of the foetus could be found. It was, therefore, concluded that the mother had probably destroyed it in consequence of the disturbance, in accordance with the morbid habit to which I have in another part of these papers alluded. It is but just, however, to the Professor to remark, that he had no reason for anticipating this fatal result; for when the Zoological Society held the farm at Kingston, the head-keeper there had twice taken a mammary kangaroo foetus from the nipple and pouch of the mother when it did not exceed an inch in length, and each time it again became attached to the nipple. It continued to grow without apparently having sustained any injury from the separation, until the death of the mother, when it was nearly fit for leaving the pouch. The person who procured Mr. Collie's specimen told that gentleman that the young one did not pass the whole of its time with the papilla in its mouth, but had been remarked more than once not having hold of it. It had even been wholly removed from the pouch to the person's hand, and had always attached itself anew to the teat. Mr. Collie, with the tip of his finger, gently pressed the head of the little one away from the teat, of which it had hold, and continued pressing a little more strongly for a minute altogether, when the teat, that had been stretched to more than an inch, came out of the young one's mouth, and showed a small circular enlargement at its tip, well adapting it for being retained by the sucker's mouth, the opening of which seemed closed in on both sides, and only sufficiently open in front to admit the slender papilla. After this Mr. Collie placed the extremity of the teat close to the mouth of the young, and held it there for a short time without perceiving any decided effort to get hold of it anew; when he allowed the pouch to close and put the mother into her place of security. An hour after-

wards the young one was observed still unattached: but in about two hours it had hold of the teat and was actively sucking.* Moreover, Mr. Morgan had detached a mammary foetus about the size of a Norway rat, and after a separation of two hours from the nipple it regained its hold, without sustaining any injury from the interruption. The young in a more advanced state has been restored to the mother with success. In Sir Robert Heron's menagerie, an infant kangaroo was found one morning abandoned and nearly dead. The mother was caught, and the young one put into her pouch, where it completely recovered, but the tail was broken. It died soon afterwards.

But although the pigmy young one has power enough to grasp the nipple, and adhere firmly to it by the muscular strength of its lips, it must not be supposed that it is capable of drawing sustenance therefrom by its unaided efforts. So foetal a rudiment would have been in a sad condition, if it had depended for its supply entirely on its own exertions; but bounteous Nature has provided the assistance, without which it must have perished. Geoffroy and the lamented Mr. Morgan have both demonstrated the action of a muscle on the mammary gland, so as to inject the milk into the mouth of the adherent suckling.

Here, again, is an instance of that wonderful adaptation of creative power, which must strike every one not absolutely petrified.

But, it may be objected, you can hardly assert that the young one's efforts of suction should always coincide with the injecting acts of the mother; and you must allow that if at any time there should be no such coincidence, the milk would be injected into the larynx, and so suffocate the foetus.

* *Zool. Journ.* vol. v.

Most true; but the same Power that willed the birth of the creature in such an embryotic condition has guarded against the possibility of this fatal result. The epiglottis and arytenoid cartilages are elongated and approximated, and the slit of the glottis is consequently placed at the apex of a conical larynx, which projects, as in the whales, into the posterior nostrils, where it is closely embraced by the muscles of the soft palate. Thus is the air-passage completely separated from the fauces, and as the mother injects the milk the divided stream passes, without the possibility of its 'going the wrong way,' on each side of the larynx into the œsophagus and stomach.*

It has been remarked, that the conveyance of the foetus into the pouch is probably effected by the mouth of the mother. The reasons for this belief are well given by Professor Owen, who observes, that apart from the other circumstantial evidence, this mode of transmission is consistent with analogy, the mouth being always employed by the ordinary quadrupeds,—dogs, cats, and mice, for instance,—for the purpose of removing their helpless offspring. The tender embryo would be more liable to injury from the fore-paws; and these, from the absence of a thumb, could not so securely effect the conveyance as the lips, which can be opposed to each other.

The advantages of such a vivarium as that belonging to the Zoological Society of London, in the Regent's Park, are here strongly manifested. Professor Owen was enabled by his autopsy to correct the error of Geoffroy

* Geoffroy first described this perfect contrivance; but, as Professor Owen observes, John Hunter seems to have foreseen the necessity of it, and, indeed, as the Professor further remarks, there are evidences in Hunter's preparations in the museum of the College, that he had anticipated most of the anatomical discoveries which have subsequently been made upon the embryo of the kangaroo.

St. Hilaire (who had even speculated on the anastomoses and distribution of the continuous vessels in the neck of the foetus to account for its junction with the maternal nipple), and to come to what may be deemed the safe conclusion as to the mode of the removal of the newly-born foetus to the pouch, where it is probably conducted to and held over a nipple by the mouth of the mother, while the pouch is kept open by her fore-paws, till she feels that her young one has, with its lips, laid hold of the sensitive extremity of the organ from which it is to derive its subsistence.*

But to return to the thylacines.

They were so very shy and wild, that it was some time before they could be turned into their outer apartment while their sleeping-place was being cleaned, without actual danger to themselves, they threw themselves about so recklessly, dashing themselves in their terror against the walls and bars of their place of confinement. When I saw them out they had a most wild and scared appearance, and made haste to escape from the light of day to the obscurity of their inner den.†

The porcupine ant-eater, whose remains Mr. Harris found in the stomach of his thylacine, is *the hedgehog* of the Sydney colonists, and, together with the *ornithorhynchus*, belongs to that other anomalous tribe of quadrupeds to which Geoffroy gave the apt name of Monotremes. In these the reptilian character still further prevails, mingled with that of birds.

Though they have no pouch, they possess the marsupial bones, which, however, play a very different part in them from that assigned to those bones in the kangaroo

* See Professor Owen's admirable paper 'On the Generation of the Marsupial Animals, with a Description of the Impregnated Uterus of the Kangaroo,' *Phil. Trans.* 1834.

† They have since become quite reconciled, and bear the gaze of the numerous spectators with tranquillity.

and true *Marsupiata*. They have a clavicular bone placed more forward than the normal clavicle, reminding the observer of the furciform bone or merry-thought in birds, to which, indeed, it is analogous; and the coracoid bone reaches the breast-bone. Their eyes are very small, and their ears are without any external appendage.

Their mode of reproduction was for a long time considered doubtful; some holding that they laid eggs like the birds and reptiles, and others that the young were brought forth alive. Those who maintained the former theory relied upon stories of nests, and eggs, and eggshells having been found; but these stories, when subjected to cross-examination, were generally found to bear a very strong resemblance to that method of reasoning, which ascribed the existence of the Goodwin Sands to the building of Tenterden steeple.

For example: one sees an ornithorhynchus come from a bank, lands with his native, and finds at the spot from whence the paradoxical animal had retreated a couple of eggs. The native tells the white man that this is the mallangong's* nest, and that those are its eggs. The eggs are secured, and triumphantly produced as conclusive evidence of the oviparous nature of the animal. They prove to be reticulated externally, and to those conversant with the subject exhibit all the characters of the eggs of a reptile, which may have been there deposited by one of that class, and have been visited by the ornithorhynchus for the purpose of seasoning its insect diet with an *omelette au naturel*. How many of these reptilian eggs the ornithorhynchus may have swallowed before it was disturbed does not appear. But we know that the ornithorhynchus burrows; and is it probable that, contrary to all the usual instincts that prompt animals to conceal

* *Mallangong* is the name given to this extraordinary animal by the natives.

their nests, eggs and young, this creature should expose its eggs openly on the bank instead of hiding them in its burrow, if, indeed, it lays eggs at all? We know, too, that each of these monotremes possesses a mammary gland; and the truth, in all probability, is, that the eggs of the echidna and ornithorhynchus are hatched internally, and that their young are brought forth alive, as a viper produces hers.

Such are these other extraordinary forms of this extraordinary land. The first, *the hedgehog* of the colonists, —now become very rare in the colony—a toothless, terrestrial, burrowing animal, living on ants, endowed with great strength, and covered with spines. The second, a heteroclit, with the fur of a mole, or, if you will, of a water vole, a bill like a duck—furnished with what may be termed, for want of a better description, an apology for teeth; forming, however, an apparatus amply sufficient for the mastication of its insect food—burrowing in the banks of rivers, and whose palmated feet enable it to swim and dive, making it perfectly at home in the water.

Like the kangaroo* and other Australian animals, these are rapidly disappearing before the march of civilization; and the noble native savage, naked but not ashamed, complains bitterly that the white man's kangaroo, as he terms the sheep and oxen of the colonist, have destroyed *his*, and declares that he ought to have compensation. He has a far better case than many who obtain it from our best of all possible parliaments.

At some future period, our readers may wish to form a more particular acquaintance with these monotremes; but at present we must leave them to write a few words on that observed of all observers, the newly-arrived hippopotamus.

* The frequency of these animals in our parks and menageries a few years since must have been observed by many. Now we rarely see one.

26th May.—This day I have seen the first living hippopotamus that ever gratified the eye in this country; or indeed, I might add, in Europe, since the time of the later Roman emperors. It appears on a coin of Marcia Otacilia Severa, the wife of Philip, who was elected by the senate and people upon the assassination of the third Gordian. There is a figure of the beast in one of the tombs of Beni Hassan, far up the Nile, and remarkable for its fresco paintings, where the upward curve of the angle of the mouth is very characteristically given.*

Our specimen was safely lodged in its newly-built apartments last night. When I first saw it, it was in its bath—a spacious and deep tank, with wooden lining, and with steps for the ease of the bather when going in and out,—and put me in mind, as I looked down on the animal's broad rounded back, of a submerged black portmanteau that had by some fairy freak been endowed with motion. It was in the most perfect health, sank and rose gradually, playfully closed its mouth—the action cannot be properly termed biting—on the woodwork at the side; sank again, and when at the bottom walked leisurely about as if looking for something, wondering, perhaps, why the luxuriant water-plants of Africa were not growing there. After disporting itself some time, it leisurely walked out, and then gave one the idea of a cetacean mounted upon four short pillar-like legs. Its keeper led the way to its sleeping apartment, and the attached animal followed him there like a dog, along the whole length of the giraffe-house to the place where the ostriches were in the winter. The dormitory of the hippopotamus was profusely strewn with clean fresh straw, and the animal having entered it, I had an opportunity of observing him closely. I gently tickled and scratched him

* A copy of this drawing, by Mr. John M'Gregor, is given in the *Illustrated London News*, 25th May, 1850.

about the eyes, muzzle, and ears, and the good-natured animal lazily lay down like a dog or a pig to enjoy the operation. When I ceased and retired, he rose with playfully open mouth to follow me; and his keeper, Hamet, who was then with him—a fine young man, with a Nubian or Egyptian cast of countenance—was obliged to shut the door of his apartment to keep him in, notwithstanding his remonstrating snort.

The first parts of his organization that struck me were the eyes and the nostrils. The former have, at first sight, a very extraordinary appearance, and convey the idea of enormous projection of the eye-ball; as if such protrusion was the result of some injury or disorder, external or internal. But no. Here is another instance of the most beautiful adaptation. The muscles of the eye must be most powerful, and must be endowed with great versatility, capable of protruding or withdrawing the eye-ball, which can be either projected remarkably or sunk within the orbit considerably, so as to adapt it for vision in the different media where it is to act, whether the animal be on land, just under the water, or far down beneath its surface. It brought to my mind a similar adaptation in birds, where the bony ring and muscles form a telescopic apparatus, in eagles and other birds of prey.

The nostrils, which are so placed that they appear above the surface of the water first when the animal rises from below, can be closed like those of a seal when the animal descends into the deep, and opened when it comes up for the purpose of taking in a supply of air. But though the nostrils can be closed like those of a seal, the machinery for working them must be more complicated than the muscles, which enable that animal merely to close or open these gates of breath at pleasure. In the hippopotamus the nostrils, which appeared to me to be situated more vertically than those of the seal, can be mounted up, as it were, by a process indicating the

presence of an orbicular sphincter with a protrusive power, so that the air can be taken in with the least possible exposure of the head.

These two portions of its animal machinery are of the greatest consequence to the well-being and safety of an animal that spends so much of its time in the water. The beautifully-contrived eye is unlike that of any mammiferous quadruped known to me. It approaches, in its power of rolling round when it is in a state of protrusion, to that of the chameleon, and, like it, must command a very extensive area. See how admirably this is fitted to the requirements of the animal. If danger threatens, the hippopotamus instinctively rushes to the river; and, while there latent, can manage to just lift his head among the water plants, and roll his eye, 'like the bull in Cox's museum,' but to much better purpose. If all is safe, and according to his observation he may turn out, he can quit his subaqueous retreat; or, if all be not right, he can quietly sink again and remain in his cool and unapproachable retreat at the bottom, occasionally rising and protruding his muzzle only for the necessary air-supply, and then down again. Thus, if the animal be on its guard, presenting no mark for a rifle, even if the hand that bore it could 'haud out' like that of the Master of Ravenswood.*

* Take the evidence of one who would have struck the dollar from between the finger and thumb of the keeper, as cleverly as ever Edgar could have done the feat.

'Seleka had sent men down the river to seek sea-cows'—the name by which the hippopotami are known to the colonists—'and they soon came running after me to say that they had found some. I accordingly followed them to the river, where, in a long, broad, and deep bend, were four hippopotami, two full-grown cows, a small cow, and a calf. At the tail of this pool was a strong and rapid stream, which thundered along, in Highland fashion, over large masses of dark rock.

'On coming to the shady bank, I could at first see only one

Professor Owen, in a most interesting account lately published,* states that the skin is almost flesh-coloured round the eyelids, which defend the peculiarly situated and prominent eyes, and that there is a single groove or fold above the upper eyelid, and two curved grooves below the lower one. At first sight, he truly says, they seem devoid of eyelashes; but on a close inspection a few very short hairs may be seen on the thick rounded margin of the upper lid. He further observes, that the protruding movement of the eyeball from the prominent socket shows an unusual proportion of the white, over which large conjunctival vessels converged to the margin

old cow and calf. When they dived I ran into the reeds, and as the cow came up I shot her in the head; she, however, got away down the river, and I lost her. The other three took away up the river, and became very shy, remaining under the water for five minutes at a time, and then only popping their heads up for a few seconds. I accordingly remained quiet behind the reeds, in hope of their dismissing their alarms. Presently the two smaller ones seemed to be no longer alarmed, popping up their entire heads, and remaining above water for a minute at a time; but the third, which was by far the largest, and which I thought must be a bull, continued extremely shy, remaining under the water for ten minutes at a time, and then just showing her face for a second, making a blowing like a whale, and returning to the bottom. I stood there with rifle at my shoulder, and my eye on the sight, until I was quite tired. *I thought I never should get a chance at her*, and had just resolved to fire at one of the smaller ones, when she shoved up half her head and looked about her. I made a correct shot; the ball cracked loudly below her ear, and the huge body of the sea-cow came floundering to the top. I was enchanted; she could not escape. Though not dead she had lost her senses, and continued swimming round and round, sometimes beneath and sometimes at the surface of the water, creating a fearful commotion.'

The victim was afterwards secured, and 'her flesh proved most excellent.'—*Five Years of a Hunter's Life in the Far Interior of South Africa*, &c. By Roualeyn Gordon Cumming, Esq., of Altyre. 2 vols. 8vo. London: John Murray, Albemarle Street. Every page of the book of this mighty hunter teems with moving accidents.

* In the *Annals and Magazine of Natural History* for June, 1850.

of the cornea, and that the retraction of the eyeball is accompanied by a protrusion of a large and thick *palpebra nictitans*, and by a simultaneous rolling of the ball obliquely downwards, and inwards, or forwards. There is, he adds, a caruncle, or protuberance, on the middle of the outer surface of the nictitating lid. The colour of the iris he describes as dark brown, the pupil as a small transversely oblong aperture, and the eyeball as relatively small, and remarkable for the extent of the movements of protraction and retraction.

The nostrils (continues the Professor), situated on prominences which the animal has the power of raising, on the upper part of the broad and massive muzzle, are short, oblique slits, guarded by two valves, which can be opened and closed spontaneously like the eyelids. The movements of these apertures are most conspicuous when the beast is in his favourite element. The wide mouth is chiefly remarkable for the upward curve of its angles towards the eyes, which gives a quaintly comic expression to the massive countenance. The short and small milk-tusks project a little, and the minute deciduous incisors appear to be sunk in grooves or pits of the thick gums: but the animal would not permit any close examination of his teeth; withdrawing his head from the attempt, and then threatening to bite. The muzzle is beset with short bristles, projecting at pretty regular distances; several of them appearing to be split into tufts or pencils of short hairs. Extremely fine and short hairs are scattered all over the back and sides; which are not very obvious, except upon a close inspection. The tail is short, rather flattened, and gradually tapering to an obtuse point.


The animal, when just out of the water, appeared to me to be of a bluish-black colour above—except the ears, which were flesh colour, and which it moved in a vivacious manner,—and of a ruddy flesh colour below. There was a scar on the left side.

The rictus of the mouth was very grotesque, and made a sharp angle upward when the creature gaped. The skin was dotted at short intervals with the apertures of the muciparous glands exuding the liquor for lubricating the hide. Though at first sight the hide looks hairless,

it has, *now*, a short coat of minute hair, as fine as floss silk, or more like the down upon the lip of a youth, or of a very young man. When it was at the bottom of the water I thought the animal looked more blue, or somewhat lighter, and the spots denoting the presence of the muco-sebaceous pores were very conspicuous.

The amphibious character of the animal's life induces us to look for some machinery which enables it to remain below the surface of the water. The venous reservoirs of the seals, and the arterial plexiform receptacles of the whales, will instantly occur to the physiologist. The latter are most complex and ample, as might be expected of organs fitted to secure a supply of aërated blood to the brain, derived from a heart that sends out some ten or fifteen gallons of blood at every stroke, through a tube of a foot in diameter, with immense velocity. One hour and ten minutes ordinarily elapse from the time of a whale's descent below the surface to that of his rising again to breathe, and Leviathan has been known to remain under for an hour and twenty minutes. It has been calculated that about a seventh of his time is consumed in respiration. The seals in their natural state have been known to remain under water for periods varying from a quarter of an hour to five-and-twenty minutes: but it has been observed that a seal in confinement has remained asleep with its head under water for an hour at a time. The period during which a hippopotamus can remain submerged does not appear to have been accurately defined; but as the animal walks leisurely about at the bottom of a river, from five to ten minutes may probably be spent by it, when disposed to remain so long without coming up.*

* It is probably reserved for Professor Owen to detect and describe the natural apparatus which enables the hippopotamus to remain under water; but we hope it will be a long time before he will have it in his power to solve the problem.



Sparrman and Mr. Cumming are conspicuous among those who have recorded the habits of the hippopotamus in a state of nature. The latter, in his wild and wonderful book, most graphically describes them.

Look on this scene :—

When the sun went down the sea-cows commenced a march up the river. They passed along opposite to my camp, making the most extraordinary sounds—blowing, snorting, and roaring, sometimes crashing through the reeds, and sometimes swimming gently, and splashing and sporting through the water. There being a little moonlight, I went down with my man Carey, and sat some time on the river's bank contemplating these wonderful monsters of the river. It was a truly grand and very extraordinary scene; the opposite bank of the stream was clad with trees of gigantic size and great beauty, which added greatly to the interest of the picture.—Vol. ii. p. 167.

And again, at p. 171 :—

At every turn there occurred deep still pools, with occasional sandy islands densely clad with lofty reeds, and with banks covered with reeds to a breadth of thirty yards. Above and beyond these reeds stood trees of immense age and gigantic size, beneath which grew a long and very rank description of grass, on which the sea-cow delights to pasture. I soon found fresh spoor,* and after holding on for several miles, just as the sun was going down, and as I entered a dense reed cover, I came upon the fresh lairs of four hippopotami. They had been lying sleeping on the margin of the river, and, on hearing me come crackling through the reeds, had plunged into deep water. I at once ascertained that they were newly started, for the froth and bubbles were still on the spot where they had plunged in. Next moment I heard them blowing a little way down the river. I then headed them, and with considerable difficulty, owing to the cover and the reeds, I at length came right down above where they were standing. It was a broad part of the river, with a sandy bottom, and the water came half way up their sides. There were four of them, three cows and an old bull; they stood in the middle of the river, and, though alarmed, did not appear aware of the extent of the impending danger.

It would be unjust to this painter with a pen to omit the following grand picture, or to present it in any

* Tracks.

other than the vivid form which it takes under his hand :—

We had proceeded about two miles when we came upon some most thoroughly-beaten, old-established hippopotamus paths, and presently, in a broad, long, deep, and shaded pool of the river,* we heard the sea-cows bellowing. There I beheld one of the most wondrous and interesting sights that a sportsman can be blest with. I at once knew that there must be an immense herd of them, for the voices came from different parts of the pool; so creeping in through the bushes to obtain an inspection, a large sandy island appeared at the neck of the pool, on which stood several large shady trees.

The neck of the pool was very wide and shallow, with rocks and large stones; below it was deep and still. On a sandy promontory of this island stood about thirty cows and calves, whilst in the pool opposite, and a little below them, stood about twenty more sea-cows, with their heads and backs above water. About fifty yards further down the river again, showing out their heads, were eight or ten immense fellows, which I think were all bulls; and about one hundred yards below these, in the middle of the stream, stood another herd of about eight or ten cows with calves, and two huge bulls. The sea-cows lay close together like pigs; a favourite position was to rest their heads on their comrades' sterns and sides. The herds were attended by an immense number of the invariable rhinoceros birds, which, on observing me, did their best to spread alarm through the hippopotami. I was resolved to select, if possible, a first-rate old bull out of this vast herd, and I accordingly delayed firing for nearly two hours, continually running up and down behind the thick thorny cover, and attentively studying the heads. At length I determined to go close in, and select the best head out of the eight or ten bulls which lay below the cows. I accordingly left the cover, and walked slowly forward in full view of the whole herd to the water's edge, where I lay down on my belly and studied the heads of these bulls. The cows, on seeing me, splashed into the water, and kept a continual snorting and blowing till night set in.—P. 194.

Upon another occasion (p. 218), Mr. Cumming fell in with a herd of about thirty hippopotami; they lay upon some rocks in the middle of a very long and broad pool: and, again, with at least thirty lying upon the rocks in

* The Limpopo.

the middle of the river. He describes the noise made by the hippopotami as similar to that of the musical instrument called a serpent. The following truculent trap will be as new to most of my readers as it is to me :—

On the 20th (July) I again rode down the river to the pool, and found a herd of sea-cows still there ; so I remained with them till sun-down, and bagged two very first-rate old sea-cows, which were forthcoming next day. This day I detected a most dangerous trap, constructed by the Bakalahari for slaying sea-cows. It consisted of a sharp little assagai, or spike, most thoroughly poisoned, and stuck firmly into the end of a heavy block of thorn wood, about four feet long and five inches in diameter. This formidable affair was suspended over the centre of a sea-cow path, at a height of about thirty feet from the ground, by a bark cord, which passed over a high branch of a tree, and thence to a peg on one side of the path beneath, leading across the path to a peg on the other side, where it was fastened. To the suspending cord were two triggers, so constructed, that when the sea-cow struck against the cord which led across the path the heavy block above was set at liberty, which instantly dropped with immense force with its poisonous dart, inflicting a sure and mortal wound. The bones and old teeth of sea-cows, which lay rotting along the bank of the river here, evinced the success of this dangerous invention.—P. 197.

But we must unwillingly leave this fascinating journal, penned amid the wildest, grandest, and most stirring scenes that ever blessed or shocked a wild hunter's vision, to return to the private history of our obese, tame, but most amusing baby. Its capture, in fulfilment of the nod of the friendly autocrat who presented it, was effected at the commencement of August in the bygone year up the Nile, nearly two thousand miles from Cairo, when its bulk was about that of a newly-dropped calf, but its proportions were much stouter and its height much lower. Its unfortunate mother was mortally wounded, and her attempt to return towards some bushes growing thickly on the river's bank, instead of taking as usual to the water, attracted the notice of the hunters, who found the calf there among the rank grass. It

slipped through their fingers, however, and instantly made for the river, which it would have gained, if one of the party had not struck the boat-hook into its flank, gaffing it as an angler would a large fish. The mark of this wound it still bears, as above mentioned.

It soon became much attached to those who had the care of it, treating them as standing *in loco parentis*, and looking to them for the supply of its wants. On its passage in the Ripon steam-ship, whence it was landed at Southampton on the morning of the 25th of May, its keeper's hammock was slung over its berth, as I was told. The poor man must have had but a disturbed time of it, for his fond charge could not bear his absence without showing anxiety bordering on distress; and at night, as I was informed, would knock up, ever and anon, with his chowder head, as Jack would call it, at the overhanging hammock to ascertain whether his sable friend was there.

The strong attachment of the animal to its keeper (writes Professor Owen, in the narrative to which we have already referred) removed every difficulty in its various transfers from ship to train, and from waggon to its actual abode. On arriving at the Gardens, the Arab who had the charge of it walked first out of the transport van, with a bag of dates over his shoulder, and the beast trotted after him, now and then lifting up its huge, grotesque muzzle, and sniffing at its favourite dainties, with which it was duly rewarded on entering its apartment. When I saw the hippopotamus the next morning it was lying on its side in the straw, with its head resting against the chair on which its swarthy attendant sat; it now and then uttered a soft complacent grunt, and lazily opening its thick, smooth eyelids, leered at its keeper.

After lying quietly about an hour, now and then raising its head and swivelling its eyeballs towards the keeper, or playfully opening its huge mouth, and threatening to bite the leg of the chair on which its keeper sat, the hippopotamus rose and walked slowly about its room, and then uttered a loud and short harsh note, four or five times in quick succession, reminding one of the snort of a horse, and ending with an explosive sound like a bark. The keeper understood the language, and told us that the animal was expressing its desire to return to its bath. The beast at this time

was in one of the compartments of the wing of the giraffe-house, on the opposite side to that in which its bath is prepared. It carries its head rather depressed, and reminded me most of a huge prize hog, but with a breadth of muzzle and other features peculiarly its own. The keeper opened the door leading into the giraffe's paddock, and walked through that to the new wing containing the bath, the hippopotamus following like a dog close to his heels. On arriving at the bath-room the animal descended with some deliberation the flight of low steps leading into the water, stooped and drank a little, dipped his head under, and then plunged forwards. It was no sooner in its favourite element than its whole aspect changed, and it seemed inspired with new life and activity: sinking down to the bottom, and moving about submerged for awhile, it would suddenly rise with a bound almost bodily out of the water, and splashing back commenced swimming and plunging about with a cetaceous or porpoise-like rolling from side to side, taking in mouthfuls of water and spurning them out again, raising every now and then its huge grotesque head, and biting the woodwork at the margin of the bath. The broad round back of the animal being now chiefly in view, it looks a much larger animal than when out of the water. After half-an-hour spent in this amusement it quitted the water at the call of its keeper, and followed him back to the sleeping-room, which is well bedded with straw, and where a stuffed sack is provided for its pillow, of which the animal, having a very short neck, thicker than the head, duly avails itself when it sleeps.

I was told that when it was at Cairo it ate a good deal of clay; and the Arabs, it seems, have expressed a desire that it should have some here. I believe that it is perfectly safe in the hands of Mr. Mitchell; and if it should be thought fit to indulge it with clay, those whom its odd ways delight may rest secure that Mr. Mitchell will not let Hippo be bricked up with our London clay; but if clay must be given, will prescribe some of the mud of the Colne or Thames, wherein the water-lilies grow so luxuriantly. In the stomachs of the young hippopotamus opened by Sparrman there was a good deal of 'dirt,' with curd and leaves quite fresh; and it is not improbable that this 'dirt' may be required by the animal to correct the acidity arising from its diet, as calves lick chalk. In scooping up the water-plants from the bottoms of rivers

and their banks with the enormous dental apparatus of the lower jaw, a considerable quantity of the soil must be taken up, and that some of it finds its way to the stomach is evident from Sparrman's evidence.

Two of his attendants, Jabar Abou Haijab and Mohammed Abou Merwan—these, as far as I can make them out, are their names—are snake-charmers, of whom and of whose performance I shall have something to say hereafter. The former, an old man, was employed by the French *savans* in Buonaparte's Egyptian expedition, and collected reptiles for Geoffroy; the latter Arab, who appears to be some fifteen years of age, and is the principal performer with the serpents, is, I have heard, his nephew, and is the playfellow of the hippopotamus. When I saw him, on the occasion of my first view of his playmate, he had a gold ear-ring and a gold finger-ring, and was clad in fantastic costume, with a feather in his head-gear, and in an old pair of Wellington boots, long since unacquainted with blacking, and a world too wide for his bare shanks. Of these he seemed more proud than of all the rest of his apparel put together, but they so galled his naked feet that they soon brought him to poultices, and he has since taken to stockings and slippers. A complaint has, I hear, been brought against him for teasing the monkeys, which he excites into a frantic state. Sheetan*—the name in which he rejoices among his familiars—pleaded guilty, and begged hard that one of the monkeys might be assigned to him for education—the height of his ambition at present being to teach his cheiroped scholar to charm serpents.

His games of romps with the hippopotamus are first-rate. After a little provocation by eccentric antics, which would have done credit to Flibbertigibbet himself, he flies, and his obese four-footed frolicsome friend shuffles

* Satan.

after him with his mouth open—and such a mouth!—in all the beauty of ugliness. This playful running after its friends open-mouthed may be interpreted in two ways: first, as it would act with its mother, half in play, half as a hint for nourishment; and secondly, as a lamb, a goat, or a calf butts, before their horns have budded, betraying a consciousness on the part of our gambolling pachyderm of the locality where the terrible offensive armour is to be with which hereafter he may bite with a vengeance.

Professor Owen states that we may reckon this young animal to be ten months old, and that it is now seven feet long, and six and a-half feet in girth at the middle of the barrel-shaped trunk, which is supported, clear of the ground, on very short and thick legs, each terminated by four spreading hoofs, of which the innermost is the smallest on the forefoot; the two middle ones, answering to those which are principally developed in the hog, are the largest in both feet.

The hind-limb (writes Professor Owen in continuation) is buried in the skin of the flank nearly to the prominence of the heel. Thick flakes of cuticle are in process of detachment from the sole. There is a well-defined white patch behind each foot, but I looked in vain for any indications of the glandular orifice which exists in the same part in the rhinoceros. The naked hide covering the broad back and sides is of a dark India-rubber colour, impressed by numerous fine wrinkles crossing each other, but disposed almost transversely. When I first saw the beast it had just left its bath, and a minute drop of a glistening secretion was exuding from each of the conspicuous muco-sebaceous pores, which are dispersed over the whole integument, at intervals of from eight lines to an inch. This gave the hide, as it glistened in the sunshine, a very peculiar aspect. When the animal was younger the secretion had a reddish colour, and being poured out more abundantly, the whole surface became painted over with it every time he quitted his bath.

Nothing can be more correct than this admirable description, with the exception of the alleged nakedness of the skin. The integument, at first sight, *does* appear naked; but it is found, as I have stated above, on a close

inspection, to be covered with very fine downy hairs, which will, probably, totally or partially vanish as the animal advances in age.

The gambols and civilities of this denizen of the Nile are not confined to his keepers. I had been told that, when out in the giraffe-paddock, one of the giraffes had bowed down its head to him one day, and that the hippopotamus opened his mouth and took the giraffe's muzzle into the gulf, which seems to be his way of kissing. On Sunday, the 9th of June, I saw one of the giraffes do the same thing, with exactly the same result. He had, I have been told, formed an acquaintance with a giraffe which was to have been brought over with him, but was unfortunately drowned.

Such is the quadruped whose animal magnetism *Punch* has so forcibly depicted attracting the crowds who are hurrying to its presence. If a mate—and this is far from improbable—should be sent over to join him in August by the same liberal and friendly potentate to whom we owe the present object of admiration, who shall predict the consequence of the double attraction?

The third Gordian did not live to see the portentous games for which he had caused so vast an assemblage of wild beasts to be brought to Rome. The *milliarium sæculum* was celebrated by Philip not without suspicion, almost amounting to proof, that the blood of his predecessor was on his head. Philip, in his turn, did not live long after the celebration of that prolonged festival, during which two thousand gladiators at once joined in the death-struggle for the gratification of the people. Defeated by Decius, who had got himself proclaimed emperor in Pannonia, Philip fell under the merciless hands of his own soldiers near Verona, in the year of Christ 249, before he had completed his forty-fifth year, and before the fifth year of his enjoyment of his bad eminence had run its course. The hippopotamus, which formed a prin-

cial feature in those murderous diversions, appears not only on the large brass of Otacilia Severa, but also on one of Philip (about A.D. 247), and on another of Hadrian. These, and the well-known plinth of the statue of Nilus, show how familiar this huge form was to Roman eyes.

I have not heard whether Mr. Wyon* has been directed to strike a medal to commemorate this substantial gift of his Highness the Viceroy of Egypt, or whether Mr. Gibson has received a commission to immortalize him in marble ; but there can be no doubt that Sir Edwin Landseer must hand down his likeness to posterity.

August, 1850.

* While these sheets were passing through the press in their present form, this gifted artist died, regretted by all who knew him and his works.

CHAPTER IX.

FOR behold, I wil send serpents and cockatrices among you, which will not bee charmed: and they shall sting you, saith the Lord.—*Jerem.* viii. 17.

Such is the version given in Barker's Bible,* of the passage which figuratively threatens the sending of the Babylonians among the Jews, 'who,' as the old commentator writes in the margin, 'shall utterly destroy them in such sort, as by no meanes they shall escape.'

The version now read in our churches runs thus,—

For behold I will send serpents, cockatrices, among you, which will not be charmed, and they shall *bite* you, saith the Lord;

and is more correct, zoologically speaking.

What the serpents threatened were, is more apocryphal. The Greek version has 'basilisks.' Both basilisks and cockatrices—at least those so-called venomous creatures, of which such marvellous tales are to be found in old authors—are fabulous creations. The Hebrew word is *Tsephuon* or *Tsiphoni* (Tsepha or Zepha), and has been rendered as applicable to the *aspic*, the *regulus* (another word for the basilisk), the *hæmorrhoos*, the *viper*, and the *cerastes*.

But whatever the species of serpents may be, the passage above cited, as well as others, which will readily occur to the scriptural scholar, shows the great antiquity of the art of charming serpents. Thus, in Psalm lviii. we have the following description of the wicked:—

4. Their poyson is even like the poyson of a serpent: like the deafe adder that stoppeth his eare.

* 1615.

5. Which heareth not the voyce of the inchanter, though he be most expert in charming.*

These incantations were too tempting to be neglected by the poets. The shepherd in Virgil alludes to their destructive powers:—

Carminibus Circe socios mutavit Ulixi :
Frigidus in pratis cantando rumpitur anguis.†

Manilius and Ovid use nearly the same expressions. The words of the former are,—

Consultare fibras, et rumpere vocibus angues.

And the Poet of Love, the Moore of his day, writes:—

Carmine dissiliunt abruptis faucibus angues
Inque suos fontes versa recurrit aqua.‡

The Psylli, and their neighbours the Marmaridæ, were among the most famous for their power over serpents. These African charmers of snakes, and the Italian Marsi, carried, if we are to believe one half of the accounts recorded of their feats, this magic art to the highest point of infallibility. The magi played upon pipes made of the legs and bones of cats to call the serpents together; upon the same principle, I suppose, that actuated the less ambitious enchanter, who, to rid themselves of mice, played upon a pipe made of their vertebræ, the dulcet and at-

* Barker's Bible. In the version now read in our churches the words are :—

4. Their poison is like the poison of a serpent; they are like the deaf adder that stoppeth her ear;

5. Which will not hearken to the voice of charmers, charming never so wisely.

And in the Book of Common Prayer the words are :—

4. They are as venomous as the poison of a serpent: even like the deaf adder that stoppeth her ears;

5. Which refuseth to hear the voice of the charmer: charm he never so wisely.

† *Pharmaceutria*, Eclog. viii.

‡ *Amor*. lib. ii. El. 1.

tractive notes of which brought every mouse within hearing to listen to the performance.

Crates of Pergamus saith, that in Hellespont, about Parium, there was a kind of men (whom he nameth Ophiogenes), that if one were stung with a serpent, with touching only will ease the paine. And if they doe but lay their hands upon the wound, are wont to draw forth all the venom out of the body. And Varro testifies, that even at this day there be some there who warish and cure the stinging of serpents with their spittle, but there are but few such as he saith. Agatharchides writes that, in Affrick the Psyllians (so called of King Psyllus, from whose race they were descended, and whose sepulchre or tombe is at this day present to be seene in a part of the greater Syrtes) could do the like. These men had naturally that in their own bodies, which, like a deadly bane and poyson, would kill al serpents : for the very air and sent that breathed from them was able to stupifie and strike them starke dead. And by this means they used to try the chastitie and honestie of their wives. For so soon as they were delivered of children, their manner was to expose and present the silly babes new borne, unto the most fell and cruell serpents they could find : for if they were not right but gotten in adultery, the said serpents would not avoid and fly from them. This nation verily in generall hath been defeated and killed up in manner all by the Nasomenes, who now inhabit those parts wherin they dwelt : howbeit a kind remains still of them, from those that made shift away and fled, or else were not present at the said bloody battell ; but there are very few of them at this day left.*

The author of *Thaumatographia*, in his chapter on nutrition, alludes to the Ophiogenes of the Hellespont, and says that they fed upon serpents, and that a certain man, who rejoiced in that diet, was thrown into a cask filled with them, and remained intact. This probably was the envoy Hexagon, who said that he came from the Psylli or Marsi, and whom the Roman consuls, by way of testing the truth of his mission, cast into a vessel swarming with venomous snakes, which miraculously harmed him not.

The Marsians in Italy at this present continue with the like

* Holland's Pliny.

naturall vertue against serpents: whom being reputed to be descended from ladie Circes son,* the people in this regard do highly esteem, and are verily persuaded that they have in them the same facultie by kinde. And what great wonder is this, considering that all men carry about them that which is poyson to serpents: for if it be true that is reported, they will no better abide the touching with man's spittle, than scalding water cast upon them: but if it happen to light within their chawes, or mouth, especially if it come from a man that is fasting, it is present death.†

Ovid, in his poetical treatise on cosmetics,‡ thus opens his lesson to his fair pupils:—

Discite, quæ faciem commendet cura, puellæ:
Et quo sit vobis forma tuenda modo.

Not only does he give them every information that can add to the attractions of their toilet—he does more, he tells them what to avoid. He warns them against witchcraft and incantation:—

Nec mediæ Marsis finduntur cantibus angues:
Nec redit in fontes unda supina suos.

Now let us see what Dr. Mead says to these supernatural gifts:—

There were formerly in Africa a nation of people called Psylli, famous for the cure of the bite of serpents, with which that country, above all others abounds (PLIN. *Nat. Hist.* lib. vii. c. 2). These people were thought to have something in their constitution so contrary to poison, that no venomous creature would touch them: and it was pretended that they made this a trial of the legitimacy of their children. The truth of the matter is, they performed the cure in a manner very surprising to the vulgar, that is, by applying their mouth to the wound and sucking out the venom. The Marsi in Italy pretended to the same power. Some ceremonies to overawe the patient and gain reverence to the operator, were added to the performance: but Celsus, the Latin Hippocrates, has wisely observed, that 'These people had no particular skill in this management, but boldness confirmed by use; for the poison of the serpent, as likewise some hunting-poisons which the Gauls

* Marsus.

† Holland's Pliny.

‡ *Medicamina faciei.*

particularly make use of, are not hurtful in the mouth but in the wound. Therefore, whosoever will, after their example, suck the wound, will be in no danger himself, and will save the life of the wounded person.'—*Medecin.* lib. v. c. 17.*

Aristotle (*Hist. Anim.* lib. viii. c. 29) states, that the saliva of a man is hostile to most serpents; and Nicander declares that serpents fly from even the smell of human spittle.

Of the efficacy of sucking the wound there can be no doubt, as we shall see when we come to consider the treatment of persons bitten by serpents. At present we must return to the regions of enchantment, from which honest Dr. Mead has drawn us aside, and call up one or two of the ancient worthies, whose names as serpent-charmers and serpenticides have survived to this day.

Whether Atyr was a Psyllian or Marsian does not appear; but Silius Italicus has immortalized him and his powers:—

Nec non serpentes diro exarmare veneno
Doctus Atyr, tactuque graves sopire chelydros.

Lucian has handed down the name of Babylonius the Chaldæan, who, sallying forth in the morning into the open country, pronounced certain sacred names from an ancient volume, made his lustrations with sulphur and a torch, stalked solemnly round in a circle thrice, and evoked all the serpents that infested the region. The reptiles obeyed him as if he had been another St. Patrick, crept out at his summons whether they would or no, and, no doubt, suffered accordingly.

That it was part of the ancient priestcraft to render the most venomous serpents innoxious, hardly needs proofs.

Herodotus relates that, in the neighbourhood of Thebes, there are sacred serpents which are quite harm-

* Mead on Poisons.

less. That they were of the most deadly nature is evident from his description; for he says that they are diminutive in size, with two horns that grow out of the top of the head. This exactly describes the poisonous cerastes, of which more anon. Herodotus goes on to state, that when these serpents died they were buried in the temple of Zeus; for, writes the Halicarnassian, they say they are sacred to that god (Ammon).* The venomous *Naiia Haje*, *El Haje*, or *Haje Nascher* of the modern Arabs, was chosen by the ancient Egyptians as the emblem of Cneph, the good deity (*δαίμων*), and as the mark of regal dignity. The front of the tiara of the majority of the statues of the Egyptian deities and kings is adorned with this serpent, and Denon's figure, with the fore-part erect and the hood expanded, represents it nearly as it appears on the sculptured stone.

Its congener, the deadly Nâg,† the cobra de capello of the Asiatic Portuguese, is still worshipped in some of the temples in India, where the Hindus believe that, in sagacity and the malicious tenacity with which it treasures up a wrong, it is not inferior to man. They have been seen, upon a pipe being played to them, to come forth from their holes in the sacred edifice, and feed from the hand: and when the people behold this most destructive serpent in so subdued and docile a state, they believe that the god has entered into the form.

The only modes by which such docility and harmlessness could be effected, without resorting to what are usually termed supernatural means, are actual extraction of the poison fangs and their glands; kindness, which, if judiciously and perseveringly managed, will tame almost every living creature; the use of certain herbs by the serpent-charmer; and lastly, an innate possession and

* *Euterpe*, 74.

† *Naiia tripudians*.

consciousness of the power, with a firm conviction that no serpent, however venomous, can injure the operator.

That most of the priests and jugglers availed themselves of the obvious and mechanical means of rendering such serpents as the cerastes and both species of naia innocuous, there can be little doubt. But when we come to examine the evidence, we shall feel as little that some snake charmers may handle the most venomous serpents, while in full possession of their power of inflicting death, with perfect safety.

Conjurors (writes Hasselquist) are common in Egypt. They are peasants from the country, who come to Cairo to earn money this way. I saw one, the 24th, who was expert enough, and in dexterity equalled those we have in Europe; but can do one thing the Europeans are not able to imitate; namely, fascinate serpents. They take the most poisonous vipers with their bare hands, play with them, put them in their bosoms, and use a great many more tricks with them, as I have often seen. The person I saw on the above day had only a small viper, but I have frequently seen them handle those that are three or four feet long, and of the most horrid sort. I inquired *and examined* whether they had cut out the viper's poisonous teeth; *but I have seen with my own eyes they do not*: we may therefore conclude, that there are to this day Psylli in Egypt; but what art they use is not easily known. Some people are very superstitious; and the generality believe this to be done by some supernatural art, which they obtain from invisible beings. I do not know whether their power is to be ascribed to good or evil; but I am persuaded that those who undertake it use many superstitions. I shall hereafter give a plainer description, with some observations on this subject.*

This was in June, and, according to his promise, Hasselquist thus resumes the subject:—

The 3rd (*July*).—Now was the time to catch all sorts of snakes to be met with in Egypt, the great heats bringing forth these vermin; I therefore made preparation to get as many as I could, and at once received four different sorts, which I have described and preserved in *aqua vitæ*. These were the common Viper, the

* *Voyages and Travels in the Levant, in the Years 1749, 50, 51, 52.*

Cerastes of Alpin, Jaculus, and an Anguis marinus. They were brought me by a Psylli, who put me, together with the French consul, Lironcourt, and all the French nation present, in consternation. They gathered about us to see how she handled the most poisonous and dreadful creatures alive and brisk, without their doing, or even offering to do, her the least harm. When she put them into the bottle where they were to be preserved, she took them with her bare hands, and handled them as our ladies do their laces. She had no difficulty with any but the Vipereæ officinales, which were not fond of their lodging. They found means to creep out before the bottle could be corked. They crept over the hands and bare arms of the woman, without occasioning the least fear in her; she with great calmness took the snakes from her body, and put them into the place destined for their grave. She had taken these serpents in the field with the same ease she handled them before us; this we were told by the Arab who brought her to us. Doubtless this woman had some unknown art which enabled her to handle those creatures. It was impossible to get any information from her, for on this subject she would not open her lips. The art of fascinating serpents is a secret amongst the Egyptians. It is worthy the endeavours of all naturalists, and the attention of every traveller, to learn something decisive relative to this affair. How ancient this art is amongst the Africans, may be concluded from the ancient Marsi and Psylli, who were from Africa, and daily showed proofs of it at Rome. It is very remarkable that this should be kept a secret for more than 2000 years, being known only to a few, when we have seen how many other secrets have within that time been revealed.

Monsieur Jacquin wrote to Linnæus that he had purchased the secret of charming serpents, and that the *Aristolochia anguicida*, the Mexican Aristolochia, or Birthwort, was the plant used by the Indians for that purpose. Forskhal also informed the illustrious Swede that the Egyptians use a species of *Aristolochia*, but without designating it. To return to Hasselquist:—

The circumstances relating to the fascination of serpents in Egypt stated to me, were principally,—

1st.—That the art is only known to certain families, who propagate it to their offspring.

2nd.—The person who knows how to fascinate serpents, never meddles with other poisonous animals; such as scorpions, &c.

There are different persons who know how to fascinate these animals; and they again never meddle with serpents.

3rd.—Those that fascinate serpents eat them both raw and boiled, and even make broth of them, which they eat very commonly amongst them; but in particular, they eat such a dish when they go out to catch them. I have even been told that serpents, fried or boiled, are frequently eaten by the Arabians, both in Egypt and Arabia, though they know not how to fascinate them, but catch them either alive or dead.

4th.—After they have eaten their soup, they procure a blessing from their scheik, who uses some superstitious ceremonies, and, amongst others, spits on them several times with certain gestures.

After making this statement Hasselquist thus continues:—

The matter of getting a blessing from the priest is pure superstition, and certainly cannot in the least help to fascinate serpents; but they believe, or will at least persuade others, that the power of fascinating serpents depends upon this circumstance. We see by this, that they know how to make use of the same means used by other nations; namely, to hide under the superstitious cloak of religion what may be easily and naturally explained, especially when they cannot or will not explain the natural reason. I am inclined to think that all which was formerly, and is yet, reckoned witchcraft, might come under the same article with the fascination of serpents. The discovery of a small matter may in time teach everybody to fascinate serpents; and then this power may be exercised by those who have not got it from the hands of the holy scheik, just as the heat would naturally hatch chicken in an Egyptian oven, whether a scheik did or did not lay himself naked on it, when the eggs are just put in: yet to this ceremony do the superstitious Egyptians ascribe the happy event of the chicken being hatched, when they are asked the reason. I have been told of a plant with which they anoint or rub themselves before they touch the serpents; but I have not hitherto received the least description of it, therefore I regard it as fabulous.

Bruce, whose testimony is worthy of all credit, notwithstanding the vile usage he met with from many of his contemporaries, shall next be called:—

The cerastes (writes the Abyssinian traveller) moves with great rapidity, and in all directions—forward, backward, and sideways. When he inclines to surprize any one who is too far from him, he

creeps with his side towards the person, and his head averted, till judging his distance, he turns round, springs upon him, and fastens upon the part next to him; for it is not true what is said, that the cerastes does not leap or spring. I saw one of them at Cairo, in the house of Julian and Rosa, crawl up the side of a box, in which there were many, and there lye still as if hiding himself, till one of the people who brought them to us came near him, and though in a very disadvantageous posture, sticking, as it were, perpendicular to the side of the box, he leaped near the distance of three feet, and fastened between the man's forefinger and thumb, so as to bring the blood. The fellow showed no signs of either pain or fear, and we kept him with us full four hours, without his applying any sort of remedy, or his seeming inclined to do so.

So much for the bite. But it may be said that the serpent may have been so mutilated as to make his bite innoxious.

To make myself assured (adds Bruce) that the animal was in its perfect state, I made the man hold him by the neck so as to force him to open his mouth, and lacerate the thigh of a pelican, a bird I had tamed as big as a swan. The bird died in about thirteen minutes, though it was apparently affected in fifty seconds; and we cannot think this was a fair trial, because a very few minutes before it had bit the man, and so discharged part of its virus, and it was made to scratch the pelican by force, without any irritation or action of its own.

Again, speaking of the incantation of serpents, Bruce says,—

There is no doubt of its reality. The Scriptures are full of it. All that have been in Egypt have seen as many instances as they chose. Some have doubted that it was a trick, and that the animals so handled had been first trained, and then disarmed of the power of hurting; and fond of the discovery, they have rested themselves upon it, without experiment, in the face of all antiquity. But I will not hesitate to aver that I have seen at Cairo (and this may be seen daily without trouble or expense) a man, who came from above the catacombs, where the pits of the mummy-birds are kept, who has taken a cerastes with his naked hand from a number of others lying at the bottom of the tub, has put it upon his bare head, covered it with the common red cap he wears, then taken it out, put it in his breast, and tied it about his neck like a necklace, after which it has been applied to a hen and bit it, which has died in a few minutes; and to complete the experiment, the man has

taken it by the neck, and beginning at his tail, has ate it, as one would do a carrot or a stock of celery, without any seeming repugnance.

What follows is strongly in favour of immunity by the use of vegetable antidotes.

We know from history that where any country has been remarkably infested with serpents, there the people have been screened by this secret. The Psylli and Marmarides of old, undoubtedly, were defended in this manner,—

Ad quorum cantus mites jacuère cerastæ.

SIL. ITAL. lib. iii.

To leave ancient history, I can myself vouch that all the black people in the kingdom of Sennaar, whether Funge or Nuba, are perfectly armed against the bite of either scorpion or viper. They take the cerastes in their hands at all times, put them in their bosoms, and throw them to one another, as children do apples or balls, without having irritated them by this usage so much as to bite. The Arabs have not this secret naturally, but from their infancy they acquire an exemption from the mortal consequences attending the bite of these animals, by chewing a certain root, and washing themselves (it is not anointing) with an infusion of certain plants in water.

The next paragraph is particularly worthy of attention. It points out the subdued state of the serpent when in the hands of one of these protected people.

One day, when I was with the brother of Shekh Adelah, prime minister of Sennaar, a slave of his brought a cerastes, which he had just then taken out of a hole, and was using it with every sort of familiarity. I told him my suspicion that the teeth had been drawn, but he assured me they were not, as did his master Kittou, who took it from him, wound it round his arm, and at my desire ordered the servant to carry it home with me. I took a chicken by the neck, and made it flutter before him; his seeming indifference left him, and he bit it with great signs of anger: the chicken died almost immediately. I saw his seeming indifference, for I constantly observed, that however lively the viper was before, upon being seized by any of these barbarians he seemed as if taken with sickness and feebleness, frequently shut his eyes, and never turned his mouth towards the arm of the person that held him. I asked Kittou how they came to be exempted from this mischief: he said they were born so, and so said the grave and respectable

men among them. Many of the lighter and lower sort talked of enchantments by words and by writing, but they all knew how to prepare any person by medicines, which were decoctions of herbs and roots.

Bruce was evidently satisfied in his own mind that a person could be so prepared as to do the same feats as these fascinators performed; and it is to be regretted that he did not make the experiment, or have it made, though it can hardly be a subject of wonder or blame that he did not.

I have seen many (says Bruce) thus armed for a season do pretty much the same feats as those that possessed the exemption naturally. The drugs were given me, and I several times armed myself, as I thought, resolved to try the experiment, but my heart always failed me when I came to the trial; because, among these wretched people, it was a pretence they might very probably have sheltered themselves under, that I was a Christian,—that, therefore, it had no effect upon me. I have still remaining by me a small quantity of this root, but never had an opportunity of trying the experiment.

On the 26th of May, the day on which I first saw the hippopotamus, I witnessed the performance of the Arab snake-charmers, of whom I have already spoken. After their dinner they came from the giraffe-house, proceeding along the gravel walk to the reptile-house, on the floor of which, about three o'clock in the afternoon, or a little later, the performance took place. The charmers took up a position at the end of the house, opposite to the lodging of the great Pythons, of whose size the old Arab had heard with something very like incredulity. The company stood in a semicircle, and at a respectful distance. There was not much difficulty in getting a front place, but those behind pressed the bolder spectators rather inconveniently forward.

Standing in the open space the old Arab said something to the young one, who stooped down under the reptile cases on the north side of the room, and took out a large deal box with a sliding cover, which looked like

a box for stowing away a set of Brobdignag chessmen, drew off the cover, thrust in his hand, and pulled out a large long naia haje. After handling it and playing with it a little while, he set it down on the floor, half squatted close to it, and fixed his eye on the snake. The serpent instantly raised itself, expanded its hood, and turned slowly on its own axis, following the eye of the young Arab, turning as his head, or eye, or body turned. Sometimes it would dart at him, as if to bite. He exercised the most perfect command over the animal. All this time the old Arab stood still, pensively regarding the operation; but presently he also squatted down, muttering some words, opposite to the snake. He evidently affected the reptile more strongly than his more mercurial relative, though he remained motionless, doing nothing that I could see but fixing his eyes upon the snake, with his face upon a level with the raised head of the serpent, which now turned all its attention to him, and seemed to be in a paroxysm of rage. Suddenly it darted open-mouthed at his face, furiously dashing its expanded whitish-edged jaws into the dark hollow cheek of the charmer, who still imperturbably kept his position, only smiling bitterly at his excited antagonist. I was very close, and watched very narrowly; but though the snake dashed at the old Arab's face and into it more than twice or thrice with its mouth wide open, I could not see the projection of any fang.

Then the old Arab, who, it was said, had had the gift of charming serpents in his family for a long series of years, opened another box, and took out four or five great lizards, and provoked the naia with them, holding them by the tails in a sort of four-in-hand style. Then the youth brought out a cerastes, which I observed seemed overpowered, as if, as the country people say, something had come over it. He placed it on the floor, but this serpent did not raise itself like the naia, but, as the

charmer stooped to it, moved in a very odd, agitated manner, on its belly, regarding him askant. I thought the serpent was going to fly at the lad, but it did not. He took it up, played with it, blew or spit at it, and then set it down, apparently sick, subdued, and limp. He then took it up again, played with it a second time, gathered it up in his hand, put it in his bosom, went to another box, drew the lid, and brought out more snakes, one of which was another naia, and the others of a most venomous kind.

Now there were two naias, with heads and bodies erect, obeying, apparently, the volition of the charmers. One of the snakes bit the youth on the naked hand, and brought the blood; but he only spat on the wound and scratched it with his nail, which made the blood flow more freely. Then he brought out more lizards of a most revolting aspect. By this time the floor of the reptile-house, that formed the stage of the charmers, began to put one in mind of the incantation-scene in *Der Freischutz*, only that the principal performers looked more like the Black Huntsman and one of his familiars than Max and Caspar, and the enchanters' circle was surrounded with fair ladies and their well-dressed lords, instead of the appalling shapes which thronged round the affrighted huntsman at the casting of the charmed bullets. The Arabs, holding the snakes by the tails, let their bodies touch the floor, when they came twisting and wriggling on towards the spectators, who now backed a little upon the toes of those who pressed them from behind. Sometimes the charmers would loose their hold, when the serpents, as if eager to escape from their tormentors, rapidly advanced upon the retreating ring; but they always caught them by the tails in time, and then made them repeat the same advances. I kept my position in front throughout, and had no fear, feeling certain that Mr. Mitchell, and those under whose super-

intendence this highly amusing and instructive establishment is so well conducted, would not have permitted the exhibition to take place, if there had been the least danger. Besides this, I observed that the charmers only used their own serpents, which they had, I presume, brought with them; and I confess that the impression upon my mind was, that they had been rendered innocuous by mechanical means.*

We have already seen that the gift or power of charming serpents is believed to be hereditary, like the alleged craft of the Dowzers, as they are called, of Cornwall, who use the divining rod with success in so many instances. The Arab lad, who is only fifteen, but who is said to have left a wife behind him in Egypt, when asked how he obtained his power, stated that his father was a holy man, and not afraid of serpents,—that neither is he afraid, and that they cannot hurt him. The old man, Jabar Abou Haijab, states that they belong to a tribe known by the name of Rufaiah, who have handed down the mystery of serpent-charming from father to son for many generations, and over whom serpents have no hurtful power. The tribe, it would seem from the accounts of these Arabs, derives its name from Rufai, a Mahommedan saint, whose tomb is said still to remain at Busrah, and to it the Rufaiah make pilgrimage. It is stated to be the haunt of numerous serpents, whose mouths are closed by the saint, so that the pilgrims go boldly among them without fear or harm.

The serpents which figure most prominently in the performance of these Arabs are the Egyptian cobra, *Naia haje*; and the cerastes, *Vipera* (cerastes) *caudalis*. A sketch of the history and habits of these snakes may be deemed not misplaced.

The Egyptian cobra, which wants the curious spectacle-

* See post, p. 388.

like mark on the back of the neck that distinguishes the Asiatic species, is of a somewhat dark and greenish hue, marked with brownish, and attaining the length of from three to five feet. This is the serpent which the Egyptian conjurers know how to render stiff and immovable by pressing the nape of the neck with the finger, and thus throwing it into a sort of catalepsy. The serpent is thus apparently converted into a rod or stick.

Traces of this conversion occur in the Scriptures,—for instance, where Pharaoh's wise men cast down their rods, which were turned into serpents, but were devoured by the serpent of Aaron.

Take thy rod and cast it before Pharaoh, and it shall be turned into a serpent.

Then went Moses and Aaron unto Pharaoh, and did even as the Lord had commanded: and Aaron cast forth his rod before Pharaoh and before his servants, and it was turned into a serpent.

Then Pharaoh called also for the wise men, and sorcerers; and those charmers also of Egypt did in like manner with their enchantments. For they cast downe every man his rod, and they were turned into serpents: but Aaron's rod devoured their rods.*

Dr. Smith, in his *Zoology of South Africa*, gives figures of no less than three varieties of *Naja haje*. They do not appear to differ specifically from the naia of Egypt. Dr. Smith closely compared them, and he could not perceive greater differences between some of the individuals from the Cape and those from Egypt than he had found between some of those inhabiting Southern Africa. The young of the Cape reptile corresponded exactly with the figure of the young Egyptian naia given by Geoffroy.

The rarest of the southern varieties is called by the colonists *Spughslang*, or spitting-snake, from its alleged power of ejecting its poison to a distance. Dr. Smith

* Barker's Bible, Gen. c. vii. See also c. iv., where it is written that the rod of Moses was turned into a serpent.

describes this reptile as being of a uniform livid, blackish-brown, the livid tinge strongest on the under parts, so as to present almost a purplish-slate colour, which becomes very dark and shining towards the head. He remarks that all naiaes of South Africa distil poison from the points of their fangs when much irritated, and are able by a forcible expiration to eject a portion of it to a considerable distance. Both the Europeans and natives aver that this snake has the power of casting its poison to a distance of several feet, especially if the ejection be favoured with the wind blowing the same way. They declare that the reptile often projects it into the eyes of those who intrude upon its haunts, and that the injury is followed by inflammation, which terminates not unfrequently in loss of sight. It must have been one of these spit-venoms that Mr. Gordon Cumming encountered, when watching in one of his hiding-holes for the brute aristocracy of the forest.

One night, while so engaged, a horrid snake, which Kleinboy had tried to kill with his loading-rod, flew up at my eye and spat poison into it. Immediately I washed it well out at the fountain. I endured great pain all night, but next day the eye came all right.*

A naval officer, who distinguished himself at the taking of Acre under Sir C. Napier, had a narrow escape from one of these naiaes. He was shooting near the Cape, when he trod close to or upon one of these horrible reptiles. The snake was coiled round his leg in a moment, and its inflated head was raised to give the fatal dash, when his companion, with admirable presence of mind, placed the muzzle of his gun close to the cobra's head, which was drawn back for the purpose of a surer aim and a more vigorous stroke, and blew its head off, without inflicting the slightest injury on his grateful friend.

* *A Hunter's Life in South Africa.*

The malignant perseverance of these serpents, when their anger is once fairly roused, is most remarkable. Dr. Smith, while walking in the vicinity of Graham's Town, happened to excite the attention of a naia, which immediately raised its head and warned him of his danger by the strength of its expiration. The serpent then commenced an advance, and the Doctor observes that had he not retired he would, in all probability, have suffered, if he had not been fortunate enough to disable it; which, possibly, would not have happened, considering, as he says, that these cobras are very active. An officer of the Cape Corps, for whose accuracy the Doctor vouches, informed that distinguished zoologist that he was chased twice round his waggon by one of them, and that the pursuit might have been prolonged if a Hottentot had not disabled the enraged reptile by a blow from a long stick.

The Asiatic form of this genus of serpents is even more highly developed than that of the African species. The general length attained by the cobra de capello in Ceylon ranges between two and four feet. Their colour varies, and the light-coloured individuals were called, in Dr. Davy's time, and perhaps are so called still, high-caste snakes, whilst those of a darker colour are designated as low-caste snakes. The largest seen by the Doctor was nearly six feet long; but Captain Percival, in his account of the island (1805), states that this hooded snake is found there of a length varying from six to fifteen feet. When enraged and preparing for an attack, the head and body are raised to a height of three or four feet, and at the same time the rest of the body is coiled to accelerate the spring, and add force to it. At this moment the membrane, which lies along part of the head and the sides of the neck, and is hardly perceptible till the animal is irritated, is distended somewhat in the form of a hood, just as it is in the Egyptian cobras; but in the Asiatic

nâg the hood is marked with a curious streak or pattern, somewhat in the shape of a horse-shoe, and resembling a pair of barnacles, or spectacles without arms, whence its French and English names of *serpent à lunettes* and spectacle-snake. Captain Percival looks upon this distention of the hood—which, it seems, always precedes the attack of the reptile—as a warning to those within the serpent's reach; and relates that he had more than once been an eye-witness of instances where the fatal bite had been avoided by parties who had been thus put on their guard. But if this signal of death be not attended to, woe to the victim! for after the serpent has exhibited the fatal sign its motions are too rapid to admit of escape from its fangs. The Captain dwells on the fondness of these deadly reptiles for music, and states that, even when newly caught, they seem to listen with pleasure to the notes, and writhe themselves into attitudes accordingly. While so employed, they must remind the spectator, who has duly read up his *Copperfield*, of Mr. Uriah Heep. This Uriah-like propensity is duly taken advantage of by the Indian jugglers, who bestow some pains in taming the cobras, and at length teach them to keep time in their writhings and nutations to the airs which they play on their flageolets.

Dr. Davy thus describes the mode of operation in Ceylon, where, as well as on the continent of India, frequent displays are made by men called snake-charmers:—

The exhibition is rather a curious one, and not a little amusing to those who can calmly contemplate it. The charmer irritates the snake by striking it, and by rapid threatening motions of his hand; and appeases it by his voice, by gentle circular movements of his hand, and by stroking it gently.

This looks very like magnetism.

He avoids with great agility the attacks of the animal when enraged, and plays with it and handles it only when pacified, when

he will bring the mouth of the animal in contact with his forehead, and draw it over his face. The ignorant vulgar believe that these men really possess a charm, by which they thus play without dread, and with impunity, with danger. The more enlightened, laughing at this idea, consider the men impostors, and that in playing their tricks there is no danger to be avoided, it being removed by the extraction of their poison-fangs. The enlightened in this instance are mistaken, and the vulgar are nearer the truth in their opinion. I have examined the snakes I have seen exhibited, and have found their poison-fangs in and uninjured. These men *do* possess a charm, though not a supernatural one, viz., that of confidence and courage : acquainted with the habits and disposition of the snake, they know how averse it is to use the fatal weapon nature has given it for its defence in extreme danger, and that it never bites without much preparatory threatening. Any one possessing the confidence and agility of these men may irritate them, and I have made the trial more than once. They will play their tricks with any hooded snake, whether just taken or long in confinement, but with no other kind of poisonous snake.

Captain Knox, in his *History of Ceylon*, observes that the Cingalese have, in the ichneumon, a powerful auxiliary against the multitude of snakes to which they are exposed. Small as it is, it will, he says, venture to attack even the cobra de capello, the poison of whose bite is hardly equalled in danger by that of any other serpent. Percival relates that one of these quadrupeds, placed in a close room where a snake had been previously introduced, instead of darting at it, ran peeping about the apartment to discover some outlet through which it might escape ; but, finding none, it returned to its master, crept into his bosom, and could by no means be persuaded to face the snake. When, however, both were removed out of the house into an open space, the ichneumon instantly flew at the reptile, and soon destroyed its antagonist. After the victory the little quadruped suddenly disappeared for a few minutes and again returned. Mr. Percival concludes that during its absence it had found the antidotal herb, and eaten of it ; but he does not state the grounds for his conclusion.

For the cure of the otherwise mortal bite the natives allege that the root of the *Ophiorrhiza mungos*, the herb pointed out by the ichneumon, is a specific. Dr. Davy saw and has recorded the effects of the bite. A cobra, about five feet long and about six inches in circumference in the broadest part, bit a hen in his presence, fixing its fangs in the skin covering the lower part of the pectoral muscle, and keeping its hold for two or three seconds, when the doctor succeeded in shaking it off. The hen seemed to be but little affected. She died, however, eight hours after the infliction of the bite.

Another cobra fastened on the thigh of a young cock, inflicting a rather severe wound, from which the blood flowed. Instantly the bird became lame; in less than a minute it could no longer stand. Respiration became hurried and rather laborious in about five minutes, and some alvine dejections took place. In about ten minutes the cock had all the symptoms of being in a comatose state, in which he continued for about five minutes, his respiration becoming gradually more feeble and laboured. In seventeen minutes his breathing was hardly perceptible, when he was seized with a convulsive fit which recurred four or five times in the course of the next minute, each fit being less violent than the former. The last of these proved fatal.

Terrible as these reptiles are, the Cingalese venerate them rather than dread them, looking on them as belonging to another world, and appearing here merely as visitors. They regard the cobra as greatly superior to man and akin to the gods, believing it to be possessed of great power. Impressed with this belief, they refrain from killing it if they can possibly avoid it, and even when they find one in the house they will not slay it, but putting it into a bag, throw bag and all into the water; for they think that it has a good and generous disposition, and that, unless it be provoked, it will do no

harm to man. The cobra which bit the hen in Dr. Davy's presence, as above narrated, was found in a bag floating down the Kalang-ganga.

With these sentiments towards those serpents, it will be no matter of surprise to find them, or snakes nearly allied to them in form and appearance, playing a distinguished part in the Cingalese theology and system of the universe.

The Naga-bhawené is described as lying under Asocra-bhawené, and as ten thousand leagues in circumference. This region is a hollow sphere. Mountains, hills, lakes, or rivers, there are none. Vegetation there is none, with one exception, the tree called Parasattoo: but this single tree amply supplies the defect; for it not only prodigally bears an immense variety of flowers and fruits, but, in addition, everything that is desirable. This wondrous country is the abode of a numerous race of serpents, similar in kind to the hooded snakes, but of great beauty, size, and power, capable of passing from one part of the world to the other, and shining like gods. No light have they but that transcendant brilliancy which emanates from their own bodies, and thus they enjoy a perpetual day, infinitely exceeding ours in brightness. These beings, illuminating all around them like so many Radiant Boys,* were during their former lives on earth persons of great purity and goodness, and almost deserving of becoming gods. But, alas for poor human nature! their high virtues were sullied by some vice, that of malice having been predominant, and they were doomed to their splendid but reptile forms. But, snakes though they be, they are Bhoodists, are possessed of a relic, and worship in temples. They lead an apolaustic life, residing in well-furnished houses, enjoying society, eating and drink-

* The Irish story of the apparition of the Radiant Boy is alluded to.

ing according to their pleasure, for they have only to form a wish and they immediately have any article of food they want ; only it always makes its appearance in the form of a frog.

They live under a monarchy, and, like the Cingalese, are distributed into castes. Their king, Mahakilla-nagajaya, is in every way superior to the rest. With his powerful assistance the gods and Asooras churned the milky sea. Mahakilla then wound himself round a rock, and they, pulling at his two extremities, set the mass in motion and accomplished their work. It is fortunate for the human race that these snakes are naturally mild and benevolent, and do harm only when provoked, for if they were so disposed, they could annihilate the whole of the inhabitants of earth by a single blast of their poisonous breaths.

The Cingalese have a legend touching the deadly enmity which is said to exist between the noya (naia) and the polonga, another most venomous snake, of which the natives have the utmost horror. The late Sir Hudson Lowe graphically described to me the terror of the natives when they beheld one, and the shrieking tone in which they cried out its name.

But the legend ?

A noya and a polonga (nintipolonga,—or tic-polonga, as it is generally termed) met, once upon a time, in a dry season when water was very scarce. The polonga, almost dying with thirst, asked the noya where he might find water. Now the noya had a little before met with a vessel of water, wherein an infant lay playing ; for it is usual with the Cingalese to wash their children in a vessel or large bowl of water, and then leave their babes to tumble and flounce about. Well, at this vessel the noya quenched his thirst, but, as he was drinking, the child, as it lay sporting therein, hit the serpent on the head with its hand. The good-natured noya, knowing

there was no malice in the case, bore the blow patiently, and having drunk his fill went his way without harming the child.

So the noya told the polonga where this vessel was, but knowing him to be a surly, hasty creature, and being desirous withal to preserve the child, made him promise not to hurt the child, who, the noya added, was very likely to give him a pat on the head, as he had done to him. Now the mind of the noya misgave him; he half repented that he had told the polonga where to find the water, and went after him, fearing his touchy temper. His worst fears were realized; for as the polonga was drinking the child patted him on the head, and the irritable serpent bit the little innocent on the hand, and killed it. This the noya saw, and burning with indignation, bitterly reproached the polonga with his baseness, fought him, slew him, and devoured him. And so these serpents when they meet do to this day, fighting to the death, and the conqueror eating the body of the vanquished. The Cingalese, in allusion to this determined hostility, have a proverb which they quote when they see men irreconcilable, comparing them to a noya and a polonga.

The cerastes, it will be remembered, was the other venomous serpent that prominently figured in the exhibition of our Arab snake-charmers at the Gardens of the Zoological Society.

The length of a full-grown cerastes is about fourteen inches. The ground colour of the upper parts varies in different individuals, being either yellowish-red spotted, and variegated with other colours; of a darker hue, differing but little from the tint of the spots, which, in such case, are seen indistinctly; or of a steel or ashy gray, with much darker spots tinted with the same hue. Beneath, the colour is a pale rose, with a pearly lustre. The

head is very distinct, and the angles of the jaws diverge considerably, giving great width to the hinder part, while the anterior portion is narrower. The nose is rounded; the nostrils are situated near its apex, each in the centre of a thick projecting scale. The eyebrows are arched, and near the middle of each is a slender, pointed, slightly recurved spine or horn, from which the serpent takes its name. The markings on the head, as well as those on the body, vary in different individuals. The body is thick in proportion to its length, and the tail is short, tapering rather suddenly, and pointed.

Its habits are most indolent; buried in the burning sand, it nurses its sweltering venom till it is roused by hunger or trampled upon, and then woe to the intruder. Its inactivity is thrown off, and its movements brisk. When once it seizes the offender it retains its hold with great obstinacy, requiring considerable force to detach it. After a naia has inflicted a wound it makes haste to escape, but the cerastes and other vipers, even when detached by force and thrown upon the ground, remain on the spot, or retreat very slowly from it.

But what is the use of the horns?

Old authors state that it lies buried in the sand with the tips of the horns just projecting above the surface, as a bait for the birds, somewhat after the manner of the anglers among fishes. These last lie concealed in the mud or sand, leaving the long fibres that spring from the anterior part of the head out to attract the smaller fry, which they then devour. The birds, they say, take the tips of the serpent's horns for little worms or grubs, approach for the purpose of feeding on them, and fall a prey to the serpent.

We find the latent and subtle habits of the cerastes alluded to in the forty-ninth chapter of Genesis, containing Jacob's prophecy relative to his offspring.

Dan shall bee a serpent by the way, an adder by the path, biting the horse heeles, so that his rider shall fall backward.*

The patriarch, by this comparison with the artful cerastes, intimates that the Danites should have their revenge upon their enemies, and extend their conquests more by stratagem than open bravery.

Nicander also refers to this habit of lying hid in the sands, or in a wheel-track, and biting the horses or cattle that pass near or over it.

This African species† has the character of being able to abstain from water longer than almost any other serpent. Indolently nestled in the arid sand, long periods elapse between the falling of the rain upon its abode. The old French quatrain, printed under the *Portrait de la Ceraste*, alludes to this abstinence :—

Ceste ceraste a comme deux cornettes
Dessus les yeux, et se passe de boire
Plus que serpent, qu'il est possible croire.
Rempliz sont de poison telles bestes.‡

Both the naia and the cerastes have been named as the asp which saved Cleopatra from the degradation of a Roman triumph ; but there can be little doubt that the cerastes was the 'poor venomous fool' to which the Egyptian queen appealed 'to be angry and dispatch.' Some, indeed, declare that she did not apply the asp at all, but inoculated herself with the poison by means of a needle ; and Galen relates from other authors, that she killed herself by pouring the venom of an asp into a wound made in her arm by her own teeth.

It seems, at first, to be a strange dispensation that creatures should be sent on earth armed with venom,—

* Barker's Bible, Gen. xlix. 17.

† It is found in the south as well as in the north of Africa.

‡ *Portraits d'Oyseaux, Serpens, &c.*, 1557.

Whose effect
Holds such an enmity with blood of man,
That swift as quicksilver it courses through
The natural gates and allies of the body ;

but if serpents were to be created as part of the system of the universe—and the links in the animal chain would be largely imperfect if such forms did not exist—it became a necessity that some of the race should be so armed in order to their taking their prey, and for their self-preservation when attacked.

Still, when one reads the catalogue of serpents which Cato and his army encountered in the Libyan deserts, where the poet* makes every bite of every serpent followed by the death of a man, the visitation is startling. And really this black list, from which it would seem that the cerastes and the other deadly snakes were leagued with Cæsar (though it may be rather superfluous in specific description, and the different ages and states of one serpent may have been multiplied into many distinct species), should not be looked on as a mere poetical fiction; for it was evidently drawn from nature, though somewhat highly-coloured.

Many hundred years after the *Pharsalia* was written, Paul Herman had in his museum at Leyden preserved in alcohol, and duly labelled and catalogued, one venomous serpent whose bite induced a deadly sleep, another which killed by an unquenchable thirst, a third whose injected poison was immediately followed by hæmorrhages from all the pores of the body—so that the doomed patient presented the appearance of that king in his dying hours who had revelled in the horrors of the St. Bartholomew—and so on.

Dr. Mead truly lays it down that, in all accidents of this nature, the mischief does not stop at the part affected,

* Lucan.

but is carried farther, even through the whole body. In the learned and observant Doctor's time, the nature of the absorbent system was not so well known as it is in ours, though there is a great deal still to learn.

Dr. Mead was of opinion that this universal communication was effected by the great activity of the nervous fluid, one part of which being infected immediately tainted all the rest. Thus, according to his theory, the whole system of nervous expansions is drawn into spasms and convulsions; and, according to the different nature of the parts to which they belong, different symptoms are produced. In the stomach and intestines, these spasms cause sickness, vomitings, and gripes; in the brain, deliria, sleepiness, and epileptic fits; in the heart, intermissions of the arterial pulse, palpitations, and swoonings; in the lungs, difficulty of breathing, with strangling and suffocations; in the liver, by the spasmodic contraction of the biliary ducts the bile is returned into the blood, and makes a jaundice; in the kidneys, the same disposition of the urinary canals interrupts the secretion of the urine, and makes it quite irregular. In short, as he says, the animal economy is all disturbed: and though different poisons may show their most remarkable effects in different parts, and these, according to the violence of the hurt, may appear in different degrees, yet the symptoms always make it plain that the first bad impression is made upon the animal spirits.

When we presently come to consider the symptoms that follow the bite of one of the venomous serpents—the common viper for example—we shall find them analogous to those that follow the seizures in plagues, cholera, fevers, and other pestilential diseases, where faintness, giddiness, palpitations of the heart, and all the other disorders which show that the nervous system is affected, are manifested; and, in truth, the sufferer in such cases is labouring under the effect of real poison.

The symptoms which follow the bite of a viper, when it fastens either one or both its greater teeth in any part of the body, are an acute pain in the place wounded, with a swelling, at first red, but afterwards livid, which by degrees spreads further to the neighbouring parts; with great faintness, and a quick though low and sometimes interrupted pulse, great sickness at the stomach, with bilious convulsive vomitings, cold sweats, and sometimes pains about the navel; and if the cure be not speedy, death itself, unless the strength of nature prove sufficient to overcome these disorders; and though it does, the swelling still continues inflamed for some time; nay, in some cases more considerably upon the abating of the other symptoms, than at the beginning. And often from the small wound runs a sanious liquor, and little pustules are raised about it: the colour of the whole skin, in less than an hour, is changed yellow, as if the patient had the jaundice.*

The rapidity with which animal life may be overcome by the poison of venomous snakes is well illustrated by Mr. Bell, the present secretary of the Royal Society; and, by the way, in one of his dissections he had proof of the danger which may be incurred in investigating their anatomy.

The head of a large rattlesnake had been taken off immediately after death. Some hours afterwards Mr. Bell was carefully dissecting the poison-apparatus; but though so long a time had elapsed since the head was cut away, Mr. Bell found that the poison continued to be secreted so fast as to require the occasional use of a piece of rag or sponge; and he remarks that there could not have been altogether less than six or eight drops of the deadly fluid distilled from the gland in the severed head.

As might be expected, if a succession of wounds be given by a poisonous snake, the creature last stricken has the best chance of recovery. One of Mr. Bell's friends had received a rattlesnake from America, and upon the principle contained in the apophthegm, *Fiat experimentum in corpore vili*, a pack of wretched rats

* Mead on Poisons.

were selected for the occasion. One was put into the cage with the serpent, which immediately struck it. The rat was dead in two minutes. A second was then placed in the cage, to the furthest corner of which it retreated, uttering piercing cries of distress. The serpent, conscious probably of the late loss of virus, lay quiet; but when about half an hour had elapsed it was irritated, and then struck the second rat, which showed no symptoms of having received the poison for several minutes; and twenty minutes after the bite elapsed before this victim died. Then a third very large rat was introduced into the cage. This showed no signs of terror, and the snake did not appear to notice the intruder, though both were watched throughout the evening, and at night they were left together. The next morning Mr. Bell's friend rose early and visited the cage. But the tables were now turned. The snake lay dead and mutilated; for the rat had feasted upon the flesh of its back.

Some of our readers may remember the distressing case of a carpenter, who came to see the show of a real live rattlesnake. Anxious probably to hear the serpent's rattle, the carpenter teased it with his rule, which, unfortunately, he dropped into the cage. He tried to regain it, and while he was attempting to reach it the snake bit him in the hand. He was taken to one of our hospitals, had the assistance of some of the first surgeons in London, and resisted the effects of the poison so long that hopes were entertained. But the shock to the constitution was too great, and after lingering many days he sank under the consequences of the bite.

Dr. Mead relates a similar case, with a much happier result:—

A man was bit on one of his fingers by a rattlesnake, just then brought over from Virginia. *He immediately put his fingers into his mouth and sucked the wound.* His under-lip and tongue were presently swelled to a great degree: he faltered in his speech, and in some measure lost his senses. He then drank a large

quantity of oil, and warm water upon it, by which he vomited plentifully. A live pigeon was cut in two and applied to the finger. Two hours after this, the flesh about the wound was cut out, and the part burnt with a hot iron, and the arm embrocated with warm oil. He then recovered his speech and senses. His arm continued swelled the next day, but by common applications soon grew easy, and the patient suffered no further mischief.

As the poison of this snake (continues Dr. Mead) is more quick and deadly than any other that we know, a remedy for this will most certainly prove effectual against that of smaller vipers, and all other creatures of this kind. The other applications here made use of (the vomit excepted) could be of no service. The pigeon, the cutting and burning the part two hours after the wound had been made, did no good. Embrocating the arm with oil only abated the swelling.

However right the worthy Doctor may be touching the pigeon, the excision, and the cautery, it is by no means clear that he has not leaped somewhat hastily to his conclusion touching the inutility of the embrocation. Besides their famous *axungia viperina*, the viper-catchers in after-times had the greatest confidence in olive-oil as a specific against the bite of those reptiles. Relying on its efficacy they suffered themselves to be bitten, and would let the symptoms go on till they become absolutely dangerous, or, as they said, till the poison was gaining on their heart, and then, swallowing draughts of the oil and rubbing the wounded limb with it over a chafing-dish of coals, became perfectly cured. The better opinion latterly seems to have been, that the embrocation was the efficient part of the process, and that the oil which was swallowed did little if anything towards the cure. It is true that, in consequence of the account in *Phil. Trans.* (No. 443) of an experiment, in which it was said that common oil rubbed into the wound had cured the bite of a viper, the physicians of the French Academy are said to have made several trials of the oil, with all possible care, and they pronounced it to be ineffectual, except as a fomentation to the swollen part.

Notwithstanding this concurrence of opinion, the viper-catchers of the latter part of the last century used olive-oil as an infallible remedy, and I have myself seen it exhibited in the case of a dog which was severely bitten in the leg by one of these serpents. The oil may be a specific against the bite of the common viper only; for it should be remembered that Linnæus, when in Scania, was applied to by a woman who had been bitten by a *chersea*. He administered the oil according to the prescribed forms, but the poor woman died in the greatest agonies. This remedy seems, however, to be effectual against the acrid exudations which emanate from the pustules of a toad. White relates that a quack ate one of those reptiles at Selborne to make the country people stare, and that afterwards he drank oil.

But Dr. Mead was a physician deserving of all confidence, and we shall see that even in his mode of treatment the oil is not discarded.

The Doctor, then, tells us that 'the first thing to be done upon the bite of a viper of any kind is, that the patient should suck the wound himself, if he can come at it; if he cannot, another person should do this good office for him. Whoever does it, ought (to prevent any inflammation of the lips and tongue, from the heat of the poison) to wash his mouth well beforehand with warm oil, and hold some of this in the mouth while the suction is performing.'

After this he prescribes an emetic (*Rad. Ipecacuan.*), 'encouraged in the working with oil and warm water.'

This is comformable, as he observes, to the practice of the Virginian Indians, who were said to cure the bite of the rattlesnake by sucking the wound, and taking immediately a large quantity of a decoction of the rattlesnake root, which acts as a strong emetic, and laying to the part the same root chewed. Piso states that the Indians use as remedies against the bite of that snake and others, the

crushed head of the serpent applied as a plaister to the wound, round which they place the green leaves of the tobacco plant.

Celsus recommends the application of dry salt to the wound ; and this Dr. Mead thinks promises somewhat more than the cautery, but not much. The so-called virtues of the celebrated Oriental snake-stones, said to be taken from the head of the cobra de capello, are mere fallacies.

This (says Dr. Mead) Signor Redi, Monsieur Charas, and myself have experienced. They will, indeed, when applied, stick to the wound for some time ; being, as appears from their make, not natural but factitious bodies, compounded most probably of calcined bones and some testaceous substances mixed together ; but when they drop off, are found to have imbibed nothing of the venom.

The remedy of the viper-catchers, long kept by them a close secret, finds greater favour in the eyes of the Doctor. Depending upon their specific, those employed in this trade, which in the days of viper-broth and viper-wine was very brisk, were no more afraid of a bite than of a common puncture, curing themselves immediately by the application of the *axungia viperina* to the wound, and to this day viper's fat boiled down is considered in some countries equally infallible ; thus, as in the case of applying the crushed head of the serpent to the wound that it had made, exhibiting the union of the bane and the antidote in the same body.

Dr. Mead enraged a viper and caused it to bite a dog in the nose. Both teeth were struck deep in. The dog howled bitterly, and the part began to swell. The Doctor diligently applied the axungia, and next day the dog was very well.

But, unfortunately for this poor dog, some of the sceptical gentlemen who saw the experiment, ascribed the cure more to the dog's saliva administered in licking himself than to the virtue of the fat. So he was bit again in the tongue and the remedy withheld. He died

within four or five hours. The Doctor made at another time a like trial with the same success.

As this axungia (says Dr. Mead) consists of clammy and viscid parts, which are withal more penetrating and active than most oily substances; so these, without all doubt, may, if immediately applied, involve and, as it were, sheath the volatil salts of the venomous liquor, and thus prevent their shooting out into those crystalline *spicula* which we have observed to be the main instruments of that deadly mischief that attends the bite. But even this cure ought not to be relied on. 'Tis safest to use the method we have mentioned; and, moreover, if the patient feels any sickness, faintness, or any of the nervous symptoms we have described, he must be put into bed, and a sweat must be promoted by cordial medicines, particularly the *Confect. Malegh.* and the salt of vipers, or, in want of this, salt of hartshorn, given in warm wine. I have often experienced the good effects of this proceeding; and, after all the pretensions of the cure by oil, in the case newly related, the man was really not recovered without these means.

And so stands the case; animal fat *versus* vegetable oil. The former may, as the Doctor says, be more penetrating; and we know that the common elder ointment has been applied to dogs and cattle bitten by vipers with the best success; but olive-oil is, nevertheless, not to be despised. The viperine remedy probably had its origin in the notion, that the best remedy for a venomous wound was to apply the crushed creature that had inflicted it to the injured part.

The demand for vipers when viper-wine and viper-broth were all the fashion for invigorating worn-out or vitiated constitutions was very great, and they formed a part of the stores of every fashionable apothecary's dispensary. Supplies were regularly sent in by the viper-catchers, and I remember hearing a story of a large box full of these reptiles having been received by one of these helpers of men in our town. The lid was not properly secured, and the imprisoned serpents wriggled out, finding their way up stairs, down stairs, and in my lady's chamber, terribly frightening the maids and apprentices, some of whom found a viper or two comfortably coiled

up between the sheets, just as they were about to step into bed.

The viperine remedy had classical authority for its ministration, nor did he who had the care of the health of Octavius Cæsar find it fail.

The renowned physitian, Antonius Musa, having certain patients in cure under his hand, who had ulcers that were thought incurable, prescribed them to eat vipers' flesh; and wonderfull it is how soone he healed them cleane by that means.*

Nor was the great Greek practitioner Craterus less successful. He was called in to a wretched slave whose skin fell from his bones, and advised him to eat vipers dressed like fish, and happily cured his patient. Galen and Aretæus speak loudly in the praise of such a remedy in cases of elephantiasis, and the former relates many stories of cures of that disease by viper-wine. The native of Tonquin, if we are to believe Dampier, treats his friends with an infusion of snakes and scorpions, accounting the arrack in which they have been digested not only an invigorating cordial, but, an antidote against leprosy and all poisons. Dr. Mead, who mentions this as well as the other instances above noticed, states that he was told by a learned physician who resided many years at Bengal, that it is a constant practice there to order in diet the cobra de capello to persons wasted by long distempers, and adds, that the physicians in Italy and France very commonly prescribe the broth and jelly of vipers for invigoration and purification of the blood. He evidently thinks very highly of the remedy, and expresses his opinion that our physicians deal too cautiously or sparingly with it. The ancient Romans of distinction, it seems, were seldom without a preparation of this kind, which they took as an invigorator, and as conducive to long and healthy life. The capons which were served up

* Holland's Pliny.

to the beautiful wife of Sir Kenelm Digby were fed upon vipers.

A word or two upon the poison and its nature, and I have done. Dr. Mead observes that the venomous juice itself is of so inconsiderable a quantity, that it is no more than one good drop that does the execution. How it operates does not seem to be quite satisfactorily made out.

Ray relates that a gentleman resident in India having friends at his house, sent for one of those natives who carry about serpents to show experiments upon the difference of their poisons. The first serpent which the exhibitor produced was of a very large size, which he affirmed to be quite harmless; and to prove his assertion, he made a ligature upon his arm and provoked the serpent to bite him. Having collected the blood which flowed from the bite to the quantity of half a spoonful, he spread it upon his thigh. He then produced a smaller one, which was a cobra de capello, and gave a terrible account of the effects of its poison. In support of his assertion, he, holding the neck of the serpent very tight, pressed out of the vesicle of the jaws about half a drop of its contents, and put it upon the coagulated blood on his thigh. A great ebullition and effervescence immediately ensued, in the manner of a fermentation, and the blood was changed into a yellow fluid, confirming the observation, that the bite of a viper produces the jaundice.

The experiment made by Dr. Mead, however, gave a very different result:—

About half an ounce of human blood received into a warm glass, in which were five or six grains of the viperine poison newly ejected, was not visibly altered either in colour or consistence. It then was and remained undistinguishable from the same blood, taken into another glass, in which was no poison at all.

The Doctor gives the following account of the microscopic appearances presented by the poison:—

Under a microscope, at first sight I could discover nothing but a parcel of small salts nimbly floating in the liquor ; but in a very short time the appearance was changed, and these saline particles were now shot out, as it were, into crystals of an incredible tenuity and sharpness, with something like knots here and there, from which they seemed to proceed ; so that the whole texture did, in a manner, represent a spider's web, though infinitely finer and more minute ; and yet withal so rigid were these pellucid spicula or darts, that they remained unaltered upon my glass for several months.

Redi found that the dried poison, when diluted with water, was still active and deleterious.

But terrible as is the effect of the attack of these cruel scourges, the bite and the instillation of the poison into a wound are the only things to be dreaded :—

*Morsu virus habent, et fatum dente minantur :
Pocula morte carent.*

Tozzi, a viper-charmer, astonished the Grand Duke Ferdinand and the natural philosophers who were present with him, who had been speaking of the certain death which would await any person who might swallow the poison of the viper by mistake, instead of spirits of wine or water, by boldly drinking a considerable portion of it. They all looked for his instant decease, but he was no more affected than he would have been by taking so much water.

Dr. Mead relates a similar experiment :—

We resolved to end our poison inquiries by tasting the venomous liquor. Accordingly, having diluted a quantity of it with a very little warm water, several of us ventured to put some of it upon the tip of our tongues. We all agreed that it tasted very sharp and fiery, as if the tongue had been struck through with something scalding or burning. This sensation went not off in two or three hours ; and one gentleman, who would not be satisfied without trying a large drop undiluted, found his tongue swelled with a little inflammation, and the soreness lasted two days. But neither his nor our boldness was attended with any ill consequence.

Those who make such experiments, as well as those who suck wounds occasioned by the bite of venomous

serpents, should be quite certain that the skin of the lips and fauces is unbroken, and that there is no wound or abrasion about the gums or tongue, otherwise fatal consequences might ensue. But if all be right, the immunity with which the venom of serpents may be taken into the stomach ceases to be surprising, when we remember that the deadly wourali poison is given in the country which produces it as a tonic with success, and that milk, so nutritious when taken as food, if it be injected into the veins is mortal.

September, 1850.

CHAPTER X.

THE Reptile-house in the Garden of the Zoological Society of London has proved to be of no small attraction. I remember when the unhappy carnivora were doomed to live therein, breathing their own impurities, and dragging on a miserable existence as long as their constitutions enabled them to bear up against the miasmata that embittered their shortened, incarcerated lives. In vain was every argument enforced against the continuation of this condemned cell for carnivorous captives. For a long time, the answer to all remonstrance was after the reply of those who still, in their despair, cling to the Smithfield abomination :*—The place was provided for the animals, and they must bear it as they could,—no matter what the cost, or the suffering, or the intolerable nuisance to all who were blest or cursed with noses. At last, the zoological John Bull was roused. Like his political brother, he showed his capacity for bearing a great deal, and was treated accordingly by those who did not know the nature of the being with whom they had to reckon. The zoological Bull gave signs of kicking, and then it was very wisely considered that there was something in his remonstrance, and a new den for the carnivorous quadrupeds was built, where they breathe the free air of heaven, and live long and comparatively happy accordingly, notwithstanding the cantankerous London clay, so fatal to the race. Their old roofed dens, every one of which looked into a close room, odoriferous with ammonia and all the rest of it, to an intensity not to be described, were appropriated to

* Now, to the joy of all disinterested Londoners, abolished.

the reptiles, whose lower organization and aptitude for heat, combined with the comparative absence of anything that could taint the air, offered no similar offence to the senses, while the lives of the animals themselves were not placed in jeopardy; and so, notwithstanding the croakings and forebodings, this Reptile-house has become one of the most popular exhibitions of that most popular vivarium. At the risk of being thought somewhat presumptuous, I beg to recommend this instance to the consideration of those, whose higher destinies are interwoven with zoological John's political brother. The latter, like the former, is, as we have already hinted, long suffering; but when he becomes restive in earnest, it is time to look out and take warning, or, depend upon it, he will toss and gore several persons.

The first remark made by an accurate observer, on looking round the apartment now dedicated to the *reptilia*, will probably refer to the fixed attitude in which they remain. There they stand or lie, motionless as statues. Here and there a snake may occasionally be seen to creep or raise itself, and a lizard to change its position, but, generally speaking, especially in the broad day, they are perfectly still; and there are times when not one is in motion behind the glass cases in which they are confined. At such periods, those may be excused who have taken the whole of the reptiles in this room for stuffed specimens. The inhabitants of that Oriental city who figure so awfully in the Arabian tale, turned into stone for their crimes, with the exception of the lonely one whose voice was heard reading the Koran in the midst of the petrified sinners, could not have looked more lifeless.

Why is this?

Because all predatory reptiles, especially snakes and lizards, take their prey by surprise; and, added to this motionless habit, the animal's haunt, when on the lookout for prey, coincides generally so harmoniously with

its colour, that the bird or insect fearlessly approaches and is caught. Place, as a familiar example, a toad in a melon-bed—a plan frequently adopted if the bed be infested with emmets. These insects approach the motionless toad, whose hue corresponds with the colour of the earth of the bed, without suspicion, and are taken by the tongue of the reptile with a motion too quick for the eye to follow. All that can be seen is the approach of the emmet within a certain distance—within, in fact, tongue-shot, and its there vanishing. The mechanism of this apparatus, by means of which the toad takes its prey, will be noticed hereafter.

Throughout the animal creation, the adaptation of the colour of the creature to its haunts is worthy of admiration, as tending to its preservation. The colours of insects, and of a multitude of the smaller animals, contribute to their concealment. Caterpillars which feed on leaves are generally either green, or have a large proportion of that hue in the colour of their coats. As long as they remain still, how difficult it is to distinguish a grasshopper or young locust from the herbage or leaf on which it rests. The butterflies that flit about among flowers are coloured like them. The small birds which frequent hedges have backs of a greenish or brownish-green hue, and their bellies are generally whitish, or light-coloured, so as to harmonize with the sky. Thus they become less visible to the hawk or cat that passes above or below them. The wayfarer across the fields almost treads upon the skylark before he sees it rise warbling to heaven's gate. The goldfinch or thistlefinch passes much of its time among flowers, and is vividly coloured accordingly. The partridge can hardly be distinguished from the fallow or stubble upon or among which it crouches, and it is considered an accomplishment among sportsmen to have a good eye for finding a hare sitting. In northern countries, the winter dress of the hares and ptarmigans is

white, to prevent detection among the snows of those inclement regions.

If we turn to the waters, the same design is evident. Frogs even vary their colour according to that of the mud or sand that forms the bottom of the ponds or streams which they frequent,—nay, the tree-frog (*Hyla viridis*) takes its specific name from the colour, which renders it so difficult to see it among the leaves, where it adheres by the cupping-glass-like processes at the end of its toes. It is the same with fish, especially those which inhabit the fresh waters. Their backs, with the exception of gold and silver fish, and a few others, are comparatively dark ; and some practice is required before they are satisfactorily made out, as they come like shadows, and so depart, under the eye of the spectator. A little boy once called out to a friend to ‘come and see, for the bottom of the brook was moving along.’ The friend came, and saw that a thick shoal of gudgeons, and roach, and dace, was passing. It is difficult to detect ‘the ravenous luce,’ as old Izaak calls the pike, with its dark green and mottled back and sides, from the similarly-tinted weeds among which that fresh-water shark lies at the watch, as motionless as they. Even when a tearing old trout, a six or seven-pounder, sails, in his wantonness, leisurely up-stream, with his back-fin partly above the surface, on the look-out for a fly, few, except a well-entered fisherman, can tell what shadowy form it is that ripples the wimpling water. But the bellies of fish are white, or nearly so ; thus imitating in a degree the colour of the sky, to deceive the otter, which generally takes its prey from below, swimming under the intended victim. Nor is this design less manifest in the colour and appearance of some of the largest terrestrial animals ; for the same principle seems to be kept in view, whether regard be had to the smallest insects, or the quadrupedal giants of the land.

I have often traced (writes an excellent observer) a remarkable resemblance between the animal and the general appearance of the locality in which it is found. This I first remarked at an early period of my life, when entomology occupied a part of my attention. No person following this interesting pursuit can fail to observe the extraordinary likeness which insects bear to the various abodes in which they are met with. Thus, among the long green grass we find a variety of long green insects, whose legs and antennæ so resemble the shoots emanating from the stalks of the grass, that it requires a practised eye to distinguish them. Throughout sandy districts, varieties of insects are met with of a colour similar to the sand which they inhabit. Among the green leaves of the various trees of the forest, innumerable leaf-coloured insects are to be found; while, closely adhering to the rough, grey bark of these forest-trees, we observe beautifully-coloured, grey-looking moths, of various patterns, yet altogether so resembling the bark as to be invisible to the passing observer. In like manner, among quadrupeds I have traced a considerable analogy; for, even in the case of the stupendous elephant, the ashy colour of his hide so corresponds with the general appearance of the grey thorny jungles which he frequents throughout the day, that a person unaccustomed to hunting elephants, standing on a commanding situation, might look down upon a herd and fail to detect their presence. And further, in the case of the giraffe, which is invariably met with among venerable forests, where innumerable blasted and weatherbeaten trunks and stems occur, I have repeatedly been in doubt as to the presence of a troop of them, until I had recourse to my spy-glass; and on referring the case to my savage attendants, I have known even their optics to fail,—at one time mistaking their dilapidated trunks for camelopards, and again confounding real camelopards with those aged veterans of the forest.*

The Wizard of the North, who had a keen eye for the harmonies of nature—and what poet, who is fond of field-sports, has not?—frequently manifests the results of his observation on animals and their haunts in his immortalities, whether of verse or prose.

So far was heard the mighty knell,
The stag sprung up on Cheviot Fell,

* *A Hunter's Life in South Africa.* By Roualeyn Gordon Cumming, Esq.

Spread his broad nostril to the wind,
Listed before, aside, behind,
Then couch'd him down beside the hind,
And quaked among the mountain fern,
To hear that sound so dull and stern.

When a stag lies with his neck stretched out and his horns lying backward in such a lair, or among other low cover, none but a very experienced stalker is likely to detect him.

I remember, one very hard winter, passing more than once, in beating over a fallow field, what I at first took for a clod, but which proved to be a partridge frozen to death. As for the young of many birds who make their nests on the ground, their colours so closely resemble the localities in which they are found, that they are hardly to be observed by any but a very keen eye. Thus White, writing of the stone-curlew (*Charadrius ædicnemus*), remarks, that the bird lays its eggs—usually two, never more than three—on the bare ground, without any protection, so that the countryman in stirring his fallows often destroys them.

The young (he adds) run immediately from the egg like partridges, &c. ; and are withdrawn to some flinty field by the dam, where they sculk among the stones, which are their best security ; for their feathers are so exactly of the colour of our grey-spotted flints, that the most exact observer, unless he catches the eye of the young bird, may be eluded.*

The similarity of colour to that of their haunts, combined with the motionless habit above alluded to, serves, then, in the case of the reptiles, the double purpose of concealment for safety and lying in wait for prey, so as to give the victim the least possible warning. Few can see the snake in the grass, and the frogs on which it dines least of all. The sportsman treads on the viper, coiled up on a bright windy day at the edge of the copse,

* *Selborne. Letter XVI.*

before he is aware of the presence of the reptile ; and so does his dog, unless he is shooting with a pointer, which, if he have a good nose and the wind, will infallibly stand as stiff as a crutch, and as if he had a whole covey before him.

The ink that traced the last sentence on the paper was hardly dry when in came a friend, who related that two of his dogs, pointers, had been bitten by a viper, that lay coiled up in the grass by the banks of a canal near the house in which I write. The serpent struck twice, and each time bit the dog attacked on the lip. The dog first struck—a very fine pointer, with a dash of the bloodhound in him—staggered, was frightfully swollen, and his system so much affected that fears were entertained for his life. Copious doses of oil, and embrocations of the same with laudanum, however, effected the cure. The mother of this dog received the second bite, but in her case the symptoms were much mitigated : there was no staggering, and, as is usual in such cases, the virus must have been much diminished before the second wound was given. The viper, on this occasion, corroborated the statements of those who lay it down as an axiom, that the true vipers, unlike other venomous serpents—the cobra, for instance—do not quit the scene of action after their murderous attacks. There it remained, and the master of the dogs took up a great stone and cast it upon the viper, without, however, crippling it, owing, probably, to some inequality in the surface of the ground whereon it rested. Then, but not till then, it made off. The owner of the dogs told me, that when they were bitten they uttered no cry. In general, dogs howl piteously when they feel the bite.

In this case we have again an instance of the virtues of oil, insisted on in a former chapter. Cato's remedy was not so simple, for he says (c. 102), that if a serpent has stung an ox or any other quadruped, one must pound

an *acetabulum* of *melanthion*, called by the physicians melanthion of Smyrna, in an *hemina* of old wine, pour it into the nostrils of the beast, and lay hog's dung to the wound. Nor is the savoury remedy applicable to the restoration of brutes only, according to his experience; for he confidently directs the same remedy to be applied to a human creature, if occasion require it. One may conceive the sort of reward reaped by the *bubulcus* by whose neglect the ox was exposed to the venomous bite, when the former was subjected to the tender mercies of the *ergastularius* in the prison* of the villa, under a dispensation which placed the life of the slave absolutely at the disposal of his master.

In that part of *The Way to get Wealth*† intitled 'The English Hous-wife,' dedicated to 'The Right Honourable and most excellent Lady, Francis, Countesse Dowager of Exeter,' with the running title of 'The English House-wives Houshold Physic,' we find a different formula set forth :—

To help all manner of swelling or aches in what part of the body soever it be, or stinging of any venomous beast, as Adder, Snake, or such-like, take Horehound, Smallage, Porrets, smal Mallows, and wild Tansey of each alike quantity, and bruise them or cut them small: then seeth them altogether in a pan with milk, oat-meal, and as much Sheeps suet, or Deares suet as a Hens egge, and let it boyl till it be a thick plaister, then lay it upon a blew woollen cloath, and lay it to the grieve as hot as one can suffer it.

In the section of the same choice book, headed 'Country Contentments,' we find it thus written :—

If your dogge have been bitten by either Snake, Adder or any other venomous thing, take the hearb Calamint, and beat it in a mortar with Turpentine and yellow Waxe, till it come to a Salve, and then apply it to the sore and it will heal it. Also if you boile the

* *Ergastulum*, where the slaves were confined, bound or chained together, when they came from work, lest they should make their escape in the night.

† Small 4to. London, 1657.

herb in milke, and give the dogge it to drink, it will expell all inward poison.

In the 'Table of hard words,' it is stated that 'Calamint is an ordinary hearb, and groweth by ditches sides by high waies, and sometimes in Gardens.'

For 'The Generall Cure of all Cattell,' we read in chapter 69, which treats 'Of venomous wounds, as biting with a mad dogge, tusks of Bores, Serpents, or such like,' in the case of the horse, as follows:—

For any of these mortall or venomous wounds, take Yarrow, Calamint, and the grains of wheat, and beat them in a mortar with water of Sothernwood, and make it into a salve, and lay it to the sore, and it will heale it safely.

But in the case of 'The Oxe, Cow, etc.'—

If your beast be bitten with a mad Dog, or any other venomous beast, you shall take Plaintain and beat it in a mortar with Bole-armoniacke, Sanguis Draconis, Barly meale, and the whites of Eggs, and playster-wise lay it to the sore, renewing it once in fourteen hours.

Most of these simple remedies—except in the case of the 'mad dog'—were, doubtless, found efficacious in these fortunate islands, where the only venomous serpent is the viper and its varieties, and the harmless common snake throws its enamelled skin among those beautiful wild flowers, whose dewy blossoms bring back to the mind's eye the images of the dear ones now gone to receive their reward in heaven, who were wont to gaze lovingly with us upon those stars of the earth long, long ago.

But we must go back to our Reptile-house, where the murderous cobra, the deadly cerastes, the fatal puff-adder,* and the lethal rattlesnakes, remind us of the danger that lurks in paths made lovely by all the floral prodigality of warmer climates. There, too, are the

* *Clotho arietans*.

giant forms of the boas and pythons, which, deprived of the stiletto of the smaller snakes, are recompensed with an herculean power of gripe that would make the ribs of an Antæus crack like pistol-shots, as they broke under the pressure of the mortal constriction.

Before we enter into a particular account of these forms, let us inquire what a reptile is.

In common parlance the word would signify any creature that creeps; but, in the language of zoologists, it is used to designate those vertebrated animals, whether quadruped, biped, or footless, that are either oviparous or ovoviviparous, breathe by means of lungs for the most part, are destitute of hair and feathers, and are without mammæ.

Their organization, although designed after the one great law which is manifested throughout the *vertebrata*, is more variously modified than that of any other class of that division of animals. If we examine the *mammalia* we find them formed after one leading type. From man to a marmoset, from a lion to a cat, from an elephant to a mouse, from a whale to the smallest cetacean that swims, the same plan of construction is manifested. Among the feathered race, from an eagle to a humming-bird, from a *dinornis* to an *apteryx*, we recognise an adherence to one settled principle of conformation. It is the same with fishes. But among the reptiles, a wide and extensive difference in the types or principles of structure must instantly strike the most superficial observer. A tortoise and a snake are both reptiles, zoologically speaking. Look at these animals alive, or examine their skeletons, and a glance shows you the wide difference of conformation displayed in the two forms. But without selecting types so obviously distant, we shall find similar discrepancies, external and internal, in this extensive class, and that even among the more cognate reptilians. Take a crocodile, an ichthyo-

saurus, or a plesiosaurus, place it by the side of a chameleon, and you will soon see, even with an unpractised eye, how different their osseous systems are. The discrepancy will be heightened if you add the skeleton of a toad or a frog to the group.

If we descend to detail, the anomaly is still greater. A tortoise is toothless; a saurian (lizard)—take a crocodile, for example—is well furnished with implanted teeth. Both, however, are quadrupedal, both have a heart with two auricles, both lay eggs with a solid calcareous shell, and the young of both are hatched in the form which they retain through life, without undergoing any metamorphosis. A serpent or ophidian is footless, but has a multitude of well-developed arched ribs. Those which are not ovoviviparous lay eggs, with a soft though calcareous covering, but their young come into the world in the same shape as that borne by their parents. A frog or batrachian has no ribs, or is possessed of the rudiments of those bones only, and has a naked skin destitute of scales. The eggs are gelatinous, and laid in water. When the young are first hatched they differ from their parents, and are furnished with branchiæ or gills, which, except in the perennibranchiate batrachians—Proteus, Axolotl, and Siren, for example—drop off as the animal arrives at its ultimate form. The metamorphosis of the anurous batrachians—those which, in their perfect state, are tailless—may be observed every spring by watching the development of the eggs of the common frog, of which Swammerdam counted 1400 as the production of one female. The greenish albumen of these eggs does not coagulate easily, and the yolk or vitellus is absorbed by the embryo. In the first stage of its existence the tadpole, or *têtard*, as the French term it, has a somewhat elongated body, a tail compressed at the sides, and external gills. Its minute mouth is armed with small hooks or teeth, which it plies vigorously upon,


the aquatic vegetables which then form its food ; and on the lower lip is a small tubular process, by means of which it adheres to the water-plants when taking its rest. In the next stage the external gills disappear, becoming covered by a membrane, and the tadpole then breathes like a fish. The head, provided with eyes and nostrils, has no neck, but is one with the now globular trunk, largely distended by the extensive digestive canal ; and the large tail enables the animal to swim well and strongly. In a short time the hind legs show themselves near the setting on of the tail, and are soon developed. Then the anterior feet are protruded ; and as the limbs advance, the tail gradually lessens and shortens, shrinking till it entirely disappears. The mouth now becomes wider and loses the horny, hook-like appendages, the head stands out more from the body, and the eyes are furnished with lids. The belly becomes more elongated, but is diminished in proportion to the size of the animal, and the intestines lose much of their length. The true lungs begin to be formed ; and as they advance, the internal gills are gradually obliterated. Thus the whole circulation is altered, and the young frog quits the water, exchanging its entirely aquatic and herbivorous life for a carnivorous, and, for the most part, terrestrial existence. These metamorphoses, which rival those of the insects, may be seen on a grander scale in the *Rana paradoxa*.

The serpents have two auricles ; the batrachians have, strictly speaking, only one, but it is separated internally into two chambers.

One word more on the discrepancies of reptile organization, and we will cease to pursue an inquiry, which would be followed out with more aptitude in a work more conversant with comparative anatomy than this can pretend to be ; but the general reader, as well as the student, should keep those discrepancies steadily in view. The observations, however, shall be confined to the varying skeletons.

Take the cranium of a crocodile. A more solid, bony mass, you could hardly see. Now turn to that of a boa. The skull, you see, is made up of a considerable number of pieces, all admirably fitted and joined together, but with such an adaptation as easily to admit of separation. Why is this? The long head and widely extensive jaws of the crocodile enable it to secure and take into the stomach a comparatively large prey. But the serpent frequently has to master and swallow an animal utterly disproportioned to the usual gape of the mouth; the skull is, therefore, so framed as easily to admit of partial dislocation, so that it may aid the dilatation of the jaws and throat, and facilitate deglutition. The ribs in the frogs, as before observed, are almost null; in the serpents they are so lavishly developed, and so freely articulated, that they are used as organs of motion. In the tortoises they are implanted and incorporated with the rest of the carapace. The ribs of a serpent may be compared to the legs of a millipede situated internally, and operating externally, principally by acting on the scutes of the belly on which it creeps. Some reptiles have not only a true breast-bone, but also an addition, which has been termed an abdominal sternum. This may be seen in the crocodiles, and seems to be produced by the ossification of the tendons of the recti muscles. But while some have two sterna, others have none at all. The chameleon, for instance, though the ribs are well formed, has no breast-bone. The tortoise, and the majority of saurians, are gifted with four sufficiently well-developed extremities. Chirotes and bipes have only two; the former an anterior pair, the latter a posterior pair, and those but poorly framed.

But though these and other great differences of organization are patent among the reptiles, every bone of every reptile is marked with such peculiarity of character as to indicate at once the class to which it belongs. A



skilful comparative anatomist can never mistake such a bone for that of any other race of animals. Professor Owen and other palæontologists have largely profited by their knowledge of this peculiarity, as appears from the grand work on British fossil reptiles by the Professor, now in the course of publication.*

From the great difference in the organization of this class, a great variety of motility was to be expected :

The motion of reptiles is as various as their structure, and exhibits a great diversity, particularly in the modes of progression. The slow march of the land tortoises, the paddling of the turtles, the swimming and walking of the crocodiles, the newts, and the protei, the agility of the lizards, the rapid serpentine advance of the snakes, the leaping of the frogs, offer a widely-extended scale of motion. If we add the vaulting of the dragons, and the flying of the pterodactyles, there is hardly any mode of animal progression which is not to be found among the reptiles.†

When we examine the different systems published by zoologists with reference to the reptiles, we find, with few exceptions, the first place assigned to the chelonians or tortoises; and before we proceed to notice the other forms, let us rapidly survey this highly-interesting order.


The land-tortoises first claim attention.

28th July.—I went to see the great tortoise (*Testudo elephantopus*) presented by the Queen to the Zoological Society of London, and arrived at the Garden in the Regent's Park between nine and ten o'clock. The morning had been rainy, but the sun bravely struggled through the clouds, which cleared away before his radiant presence, as the story-book has it, and I saw the venerable reptile in its paddock, before the newly-erected hut built for its reception near the otter's pond. It is the largest I ever beheld. The ancient seemed to be in a

* *A History of British Fossil Reptiles.* By Richard Owen, F.R.S., &c. 4to. London: Printed for the Author.

† *Penny Cyclopædia*, vol. xix. p. 410.

dreamy kind of doze, with its head tucked into its shell, which glittered—still moist with the rain that had fallen—in the sunbeams,—a shell fit to make a lyre for Polypheme, if he had been inclined to try his hand, when tired of the hundred reeds of decent growth that made a pipe for his capacious mouth. Though the weather had been very wet since its arrival a day or two previously, it did not seem to have availed itself of the shelter of its hut. Another comparatively small land-tortoise was also in the enclosure, near a corner, but entirely exposed to the weather. One colossal anterior foot of the dozing giant rested on its sole; its fellow was carelessly lying on its side. The soles of both the hind feet were on the turf. I scratched the sole of the anterior foot, which was exposed, and then the head. The sleeper was awakened, and put forth its long serpentine neck, opened one eye very deliberately, and then the other as lazily, gave a gasp or two, withdrew the head, and then again protruded it. Cabbages, lettuces, and vegetable marrows, the latter equalling in tempting appearance those which the mad gentleman placed upon the top of Mrs. Nickleby's wall, or projected into her garden, lay scattered in profusion around. In many of these the trenchant bill of the reptile had made incision; and as they had forgotten to provide the royal guest with a napkin, fragments of the last meal remained hanging about its horny lips. Large as the creature is, one may easily conceive the disappointment of the spectator who first sees it at rest. When it is in motion and the huge body is raised on the pillar-like legs, it is a much more striking object. Professor Owen had been summoned to Buckingham Palace to see it before its removal to the Garden in the Regent's Park, by the gracious direction of her Majesty, and, in the presence of Prince Albert, proceeded to take the dimensions of the girth of the animal. To do this more effectually, he bestrode the



reposing mass. While thus employed the tortoise, who probably

Never in that sort
Had handled been before,
What thing upon his back had got
Did wonder more and more ;

and walked off with the Professor, to the great amusement of the Prince, while the philosopher, as he rode along, calmly continued his measurement, which gave twelve feet as the circumference of this fine old Galapagosian. There appears to be good ground for believing that 175 summers and winters have passed over the head of this doughty devourer of vegetables ; and there is no reason for coming to the conclusion that, if it had been left undisturbed in its native wilds, it might not have seen as many more. The great fossil testudines of the Himalaya probably attained a much greater age ; and when we consider the regularity of living, and the quiet habits of the tortoises, the enduring nature of their organization, and their great tenacity of life, we may be pardoned if we hint at the probability that, under favourable circumstances, vitality might endure

As of old for a thousand long years.

The tortoises have no teeth to lose, no irritable nervous system to wear out the durable animated materials encased in their impenetrable armour.

Dampier and Mr. Darwin saw these enormous reptiles in their native haunts on the islands of the Galapagos Archipelago. The former describes them as being so numerous, that 500 or 600 men might subsist on them for several months without any other provision ; adding, that they are extraordinarily large and fat, and that no pullet is better eating. The latter, in his excellent *Journal*, notices their numbers as being very great, and states his belief that they are to be found in all the islands of the Archipelago. In his walk among the little

craters which there abound, the glowing heat of the day, the rough surface of the ground, and the intricate thickets, produced great fatigue; but, with the true spirit of a naturalist, he says that he was well repaid by the Cyclopiian scene. He met two large tortoises, each of which must have weighed at least 200 pounds. One was eating a piece of cactus; and when Mr. Darwin approached it looked at him, and then quietly walked away; the other gave a deep hiss, and drew in his head. Those huge reptiles, surrounded by the black lava and large cacti, appeared to his fancy like some antediluvian animals. Mr. Darwin was informed by Mr. Lawson, an Englishman, who, at the time of his visit, had charge of the colony, that he had seen several so large that it required six or eight men to lift them from the ground, and that some had yielded as much as 200 pounds of meat. The old males, readily distinguished by the greater length of their tails—for that appendage is always longer in the male than in the female—are the largest, the females rarely growing to so great a size. They prefer the high, damp parts of the islands, but also inhabit the lower and arid districts. Those that live in the islands where there is no water, or in the arid parts of the others, feed chiefly on the cactus, whose succulent nature compensates for the want of liquid. But those which frequent the higher and moist regions, revel in a diet of the leaves of various trees, a kind of acid austere berry, called guayavita, and a pale green filamentous lichen, hanging in tresses from the boughs of trees. It must not, however, be concluded that these tortoises do not care about water; for Mr. Darwin tells us that they are very fond of it, drinking large quantities when they can get it, and wallowing in the mud when they find it. The larger islands alone, it appears, possess springs, which are always situated towards the central parts, and at a considerable elevation. The tortoises which frequent

the lower districts are therefore obliged, when thirsty, to travel from a long distance. Broad and well-beaten paths, the result of these travels, radiate off in every direction from the wells, even down to the sea-coast. This was not lost upon the Spaniards, who followed them up, and so discovered the watering-places. When Mr. Darwin landed at Chatham Island, he could not imagine what animal travelled so methodically along the well-chosen tracks. Near the springs it was a curious spectacle, he observes, to behold many of these great monsters, one set eagerly travelling onwards, with outstretched necks, and another set returning, after having drunk their fill. He remarked that, when the tortoise arrives at the spring, it buries its head in the water above the eyes, quite regardless of any spectator, and greedily swallows great mouthfuls, at the rate of about ten in a minute. According to Mr. Darwin, the inhabitants say that each visitor stays three or four days in the neighbourhood of the water, and then returns to the lower country; but they differed in their accounts respecting the frequency of those visits. Mr. Darwin thinks that the animal probably regulates them according to the nature of the food which it has consumed; but he observes that it is certain that tortoises can subsist, even on those islands where there is no other water than what falls during a few rainy days in the year. The rate of travelling in the visits to the springs, or when going to any definite point, is said by those who have come to their conclusion from observations on marked individuals, to be about eight miles in two or three days, and they continue to move onwards both by night and by day. Mr. Darwin watched one large tortoise, and found that it walked at the rate of sixty yards in ten minutes; that is, 360 in the hour, or four miles a-day, allowing a little time for it to eat on the road.

The love-pranks of the male are continued with a de-

liberation worthy of a creature whose motions in excavating the earth for hibernation are so ridiculously slow, that White describes the movement of the legs when so employed, as little exceeding that of the hour-hand of a clock. Mr. Darwin relates, that when the galapagos tortoise is *solus cum solá*, he utters a hoarse roar or bellowing, which can be heard at the distance of a hundred yards, and then is vocally silent for the rest of the year. The female, it is said, never makes her voice heard ; if, indeed, she have one. The white spherical eggs are laid in October, the female depositing them together where the soil is sandy, and covering them up with sand. Where the ground is rocky, she drops them indiscriminately in any hollow. Seven were found placed in a line in a fissure. One measured by Mr. Darwin was seven inches and three-eighths in circumference. As soon as the young tortoises are hatched they are exposed to the attacks of the buzzard, which has the habits of the caracara, and fall a prey in great numbers to that bird. Accidents, such as falls from precipices, seem to be the principal events against which these tortoises have to guard. Several of the inhabitants told Mr. Darwin that they had never found one dead without some such apparent cause. They believe that these animals are, like the majority of Persian cats, absolutely deaf ; and Mr. Darwin declares with certainty that they do not overhear a person walking close behind them. He was amused, when overtaking one of these great monsters as it was quietly pacing along, to see how suddenly, the instant he passed, it would draw in its head and legs, and uttering a deep hiss, fall to the ground with a heavy sound, as if struck dead. He frequently got on their backs, and then, upon giving a few raps on the hinder part of the shell, they would rise up and walk away ; but he found it very difficult to keep his seat.

The flesh of these tortoises is largely consumed, both


fresh and salted. It is not unusual to collect them, barrel them up alive, put them on shipboard, and take them out as they are wanted, when they do not appear to have wasted much in consequence of their fast. From the fat a fine clear oil is prepared; and when a tortoise is caught, the state of its fatness is ascertained by a very summary process, which must be more satisfactory to the agent than the patient. The captor makes a slit with a knife in the skin near the animal's tail, so as to see inside its body whether the fat under the dorsal plate is thick. If it be not, the tortoise is liberated for that time, walks away, and soon recovers so as to be none the worse for the operation. Those who follow this somewhat trenchant course of experiment are soon made aware, that to secure one of these tortoises it is not sufficient to turn them like turtle; for, as Mr. Darwin tells us, they are often able to regain their upright position after having been so left on their backs.

In America people have an odd way of immortalizing themselves, and leaving intimations to friends and succeeding visitors where they have been. When they find a tortoise, they turn it up, cut their names with a knife on the investing horny plates of the plastron or ventral portion of the shell, and then, setting the reptile on its legs, give the walking inscription its liberty.

But if we are to credit ancient legends, our royal tortoise and its Galapagosian brethren must hide their diminished heads. De Laet avers that they grow to such a size in Cuba, that one will carry five men on its back, and walk off with them. But some authors never like to be outdone, and the writer of *Thaummatographia*, who, to do him justice, is a most industrious collector of marvellous stories, gives us one on the authority of Leo, that throws all other testudinarian tales into the shade. A traveller in Africa, weary and way-sore at the end of a fatiguing day, after seeking in vain for shelter, looked

about, as the shades of evening deepened, for some insulated rock in the desert on which he might repose, secure from the fierce or poisonous animals that infested those dreary wilds. At length, just as darkness overtook him, he saw what he wanted, climbed it, found a good flat place on its summit, lay down, and soon forgot the labours of the past day in a heavy slumber, from which he awoke not till the sun was up, and then he found that his dormitory had been moved nearly three thousand paces from the spot where he had laid down. This made him look about him, when he discovered that what he had taken for a rock was a tortoise, that had gone on feeding during the night, but at so imperceptibly slow a pace that the sleeper was not aware of the motion.

The great Galapagos tortoises which have hitherto been brought to this country have never lived long. They have thriven apparently till the time of hybernation arrived, and then have slept never to wake again. The returning spring has always found them dead. Whether they have not the means of properly laying themselves up and of reposing in the temperature exactly suited to their case, or have been fed too liberally on lettuce, which acts as an opiate when taken in any large quantity, are questions that have been considered, but as yet have not been satisfactorily answered. Taking into the account their usual diet in a state of nature, it may be questioned whether it is advisable to feed these gigantic tortoises so much on lettuces. The quantity of opium which must find its way into the system under so large a consumption must be very considerable ; and it would be as well to try the effect of a supply of other succulent vegetables, such as gourds and cabbages, with a fair proportion of lettuce. And yet the 'old tortoise' immortalized by White selected milky plants, such as lettuces, dandelions, and sow-thistles, as its favourite dish ; and for years continued to retire under ground about the middle of Novem-



ber, coming forth again about the middle of April. Its age was not known, but it had been kept for thirty years in a little walled court; and in a neighbouring village one was kept till it was supposed to be a hundred years old. The tortoise introduced into the garden of Lambeth Palace in the time of Archbishop Laud continued to live there till the year 1753, and its death was then attributed to the neglect of the gardener rather than to age. The author of *Physico-theology*,* to whom the writers of modern treatises are so largely indebted, saw it in August, 1712, 'in my Lord Archbishop of Canterbury's garden,' and speaks of it as having been there since the time of the prelate† who smoothed the path of the royal martyr from earth to heaven, and received, as the cold complaining eye of the victim was fixed steadily on him, the mysterious 'Remember!' from dying lips. The shell of this tortoise was, and probably is, preserved in the library of the palace at Lambeth. Sir Robert Heron relates that Mr. Reid, near York, had (1827) two water-tortoises brought over from the siege of Belleisle, which commenced in 1761. One of them having wandered, was missing for sixteen years, and was then found on cleaning out another pond. It appears that both the tortoises were alive and very tame in November, 1850, the date of Sir Robert's privately-printed, but not published, *Notes*; at least no mention is made of their death.

White's tortoise—for it afterwards became his, to the evident satisfaction of that charming naturalist and excellent man,—when it first appeared in the spring, discovered very little inclination towards food, but in the height of summer grew voracious. As the summer declined, so did its appetite; and for the last six weeks in autumn it hardly ate at all. Its habits seemed to have

* Derham.

† Juxon.

differed widely from those of the great tortoises of the Galapagos. They, as we have seen, delighted, after a long abstinence probably, to plunge their heads into the water and to wallow in mud. White's tortoise appears to have lived in positive dread of the element.

No part of its behaviour (writes White) ever struck me more than the extreme timidity it always expresses with regard to rain ; and though it has a shell that would secure it against a loaded cart, yet does it discover as much solicitude about rain as a lady dressed in all her best attire, shuffling away on the first sprinklings, and running its head up in a corner. If attended to, it becomes an excellent weather-glass ; for as sure as it walks elate, and as it were on tiptoe, feeding with great earnestness in the morning, so sure will it rain before night.

Darwin's great tortoises marched by night as well as by day in their walks to the wells. White describes his as totally a diurnal animal, and never pretending to stir after it became dark : and yet he declares that nothing could be more assiduous than the creature, night and day, in scooping the earth and forcing its great body into the cavity intended for its hybernaculum. This, however, it must be remembered, was a work of necessity, in which delay would have been dangerous. Beginning its excavation on the first of November, it had no time to lose with the biting frosts close at hand ; and if it had been overtaken by them it would have suffered even more than Captain Dalgetty, when he learned the rules of service so tightly under old Sir Ludovick Lesly that he was not likely to forget them in a hurry:—

Sir, I have been made to stand guard eight hours, being from twelve at noon to eight o'clock of the night, at the palace, armed with back and breast, head-piece, and bracelets—being iron to the teeth, in a bitter frost, and the ice was as hard as ever was flint ; and all for stopping an instant to speak to my landlady, when I should have gone to roll-call.

White's tortoise was careful to avoid the other extreme of temperature:—



Though he loves warm weather, he avoids the hot sun ; because this thick shell, when once heated, would, as the poet says of solid armour, 'scald with safety.' He, therefore, spends the more sultry hours under the umbrella of a large cabbage leaf, or amid the waving forests of an asparagus bed. But as he avoids heat in the summer, so in the decline of the year he improves the faint autumnal beams, by getting within the reflection of a fruit-wall ; and though he never has read that planes inclining to the horizon receive a greater share of warmth, he inclines his shell, by tilting it against the wall, to collect and admit every feeble ray.

This pet was a huge sleeper ; for it not only remained under the earth from the middle of November to the middle of April, its arbitrary stomach and lungs enabling it to refrain from eating as well as breathing during that time, but slept the greater part of the summer ; for it went to bed in the longest days at four in the afternoon, and often did not stir in the morning till late. Besides, it retired to rest for every shower, and did not move at all on wet days.

When one reflects (says White) on the state of this strange being, it is a matter of wonder to find that Providence should bestow such a profusion of days, such a seeming waste of longevity, on a reptile that appears to relish it so little as to squander away more than two-thirds of its existence in a joyless stupor, and be lost to all sensation for months together in the profoundest of slumbers.

But notwithstanding this lethargic temperament the old tortoise knew its benefactress, and as soon as the good old lady came in sight, who had waited on it for more than thirty years, it hobbled towards her with awkward alacrity, but remained inattentive to strangers. There was, too, an annual period when he was unusually on the alert. We think we can see the worthy pastor of Selborne looking down, with the air of the melancholy Jaques, on his favourite, and exclaiming:—

Pitiable seems the condition of this poor embarrassed reptile : to be cased in a suit of ponderous armour, which he cannot lay aside ; to be imprisoned, as it were, within his own shell, must preclude, we should suppose, all activity and disposition for

enterprize. Yet there is a season of the year (usually the beginning of June) when his exertions are remarkable. He then walks on tiptoe, and is stirring by five in the morning; and traversing the garden, explores every wicket and interstice in the fences, through which he will escape if possible; and often has eluded the care of the gardener, and wandered to some distant field. The motives that impel him to undertake these rambles seem to be of the amorous kind; his fancy then becomes intent on sexual attachments, which transport him beyond his usual gravity, and induce him to forget for a time his ordinary solemn deportment.

It is very possible that Cupid may have then been bestriding him. White's description looks very like the restlessness of passion,—

Nec tibi Vespero
Surgente decedunt amores,
Nec rapidum fugiente solem.

But the love of liberty and, not improbably, an annual migratory impulse in search of fresh pasture, may have been the prevailing motive. At all events, neither he nor the other *φεγεοικος* are without their comforts. Each of them is independent of any capricious landlord, and both snail and tortoise, if they could speak, might say what it is a great privilege to be able to say, 'Death alone can turn me out of this house.'

The tenacity of life with which the *Testudinata* are gifted would be hardly credible to those who have not closely studied the subject. No well-regulated mind can read of some of the experiments which have been made to place the fact beyond all doubt without being shocked; but averse as every good man must be to the infliction of pain or death, it is but fair to allow that such experiments may be more cruel in appearance than in reality. Redi's operations must have been attended with instant death if made upon the higher and warm-blooded *vertebrata*. His tortoises lived, and showed no signs of acute suffering.

In the beginning of November he opened the skull of a land-tortoise, removed every particle of brain, and

cleaned the cavity out. The animal was then set at liberty, but instead of dying or remaining motionless, it groped its way about freely as its inclination directed, without the aid of sight; for when the animal was deprived of its brain it closed its eyes, which it never opened afterwards. The wound was left open, but skinned over in three days, and the tortoise continued to go about till the middle of May, when it died. On examining the skull, the cavity which had contained the brain was found empty and clean as it had been left, with the exception of one small, dry, black clot of blood.

But this was not a solitary instance. Many other land-tortoises were subjected to the same treatment in November, January, February, and March. The result was similar, with some exception; for some moved about freely, but others, though they showed that they were alive by other motions, did not. Freshwater-tortoises, when made the subjects of the same experiment, acted like the others, but did not live so long. But Redi had a notion, that if the marine tortoises were deprived of their brain they would live for a very long time; for having received a turtle which was very much wasted and faint, he opened its skull and treated it in every respect as he had treated the land-tortoises, and, emaciated as it was, it lived six days after the operation.

Redi proved the enduring vitality of these reptiles by a more decisive experiment. In the month of November he cut off the head of a large tortoise; the headless animal did not expire till twenty-three days had elapsed. This decapitated existent did not, indeed, move about like those which had only been robbed of their brain; but when any mechanical stimulus, such as pricking or poking, was applied to the anterior or posterior extremities, the headless trunk drew them up with considerable liveliness, and exhibited many other motions. To free himself from all doubt as to the vitality of these animals

under such circumstances, Redi cut off the heads of four other tortoises. Twelve days after decapitation he opened two of them, when he beheld the heart beating, and saw the blood enter and leave it.

These were Redi's experiments: for them he is answerable. But it is only just to remark, that in this frightful state of life in death there may be more of irritability than sensation. The restoration of mutilated organs in the reptiles is wonderful to the uninitiated. Look at the eye: a subject for Newton. I remember to have seen in a large glass bowl a number of aquatic lizards, which were undergoing the curative and reproductive process, which kind Nature had initiated—ay, and carried out completely—after they had been deprived of an anterior extremity or an eye. In both cases the organs were reproduced. The anterior extremity is nothing when compared to the organ of vision; but, after all, the cornea, through which we see such glorious sights, is nothing but a modification of the skin, and the rest of that wonderful orb in a low grade of animal nature may be easily supplied. It may occur to some that the clot in the cranium of Redi's brainless tortoise was an attempt to restore the great centre of the nervous system; but the probability is, that nature was endeavouring to repair the injury, and to secure as much of life as was to be retained under the shocking circumstances.

The length of time during which Redi's headless tortoise lingered will not surprise those who have seen how much life remains, and for how long, in a turtle, after all its wasting by the unhealthy voyage. We have been taught, and truly with respect to the higher grade of animals, that in the blood is the life. But in the case of the testudinate, which is to furnish forth the soup, the calipee, the steaks, the currie, for which and upon which aldermen live, any one who wishes to descend into the abysses from which that ambrosial feast is furnished


forth, may find a headless trunk suspended neck downwards that it may bleed more freely, and the head placed bill uppermost on a cold plate for the resting-place of the severed neck. The snapping of the jaws of that distant head, and the movements of that suspended body, have startled more than one neophyte who has been taken down to see 'what a turtle can do when its head is cut off;' especially if, as it has happened to some of my friends, their fingers have chanced to come within reach of the turtle's bill at the snapping moment.

That such post-decapitation snaps and motions should raise horrible ideas of comparison is hardly to be wondered at; and I remember this instance of the vitality of the turtle's head being brought forward in corroboration of the sickening story of the blush on Charlotte Corday's face, when the brutal executioner struck it on the cheek as he held up the severed head to the execration of the friends of the imp Marat, the idol of the *canaille* that surrounded the guillotine. A friend witnessed an execution in Italy by an instrument resembling the Scottish maiden. He was very near the scene of death, and when the criminal's head was held up, he saw the eyes roll from right to left and from left to right. Those best qualified to judge, are of opinion that this and similar movements are merely convulsive, and that the severed head does not feel. To say nothing of the stunning shock to the nervous system, more especially if the ponderous trenchant axe falls upon the occiput, as it did in the case of the unfortunate Louis XVI., whose under-jaw was said to have been left on the trunk, either from his shrinking just before the fatal moment, or the shortness of his neck; the blood-vessels of the brain must be so speedily emptied when a person suffers death by the guillotine, that all sensation must vanish in a very short space of time: but it is very far from clear that the head does not continue to live during that short

space, and if it feels even for a moment or two, who shall say that in those moments it may not suffer an eternity of agony and shame. It has been hinted, that during that diabolical French carnival, when terror reigned supreme, and fraternity—the fraternity of Cain and his brother—had reached its culminating point, observations were made on the newly-severed heads that gave evidence of action, if not of feeling, after their separation from the bodies of the victims of the revolutionary tribunal. Some of our readers may have heard of another horror of that accursed time. At first, when the executions were few and far between, the body was thrown into quick lime ; but as the thirst for blood advanced, when the guillotine was *en permanence*, and though it rested not, could not do the work of extermination fast enough ; when the cord, and the pike, and the sabre, and the musket, and the cannon, were all brought into action, and the *noyades* were added to the *fusillades*, the utilitarians began to think that the quick-lime operation was destructive of much good animal matter. So the muscle of the slaughtered was converted into adipocere for the candle manufactory, and their skins furnished no small quantity of exquisite leather. Little did the beauty of that age, as she charmed all eyes at the ball, think whence came the light in which she shone, or that the delicate glove which set off her more delicate arm was not the spoil of the kid.*

More than enough of these horrors—may they never rise again to shock humanity in our time !—and ‘ return we ’—as a most excellent judge was wont to say when leading back the jury from a digression into which he had seduced them, but always with the effect of arresting their attention more strongly to the issue which they

* The skin of a human being, properly prepared, is very like fine kid leather.



had to try—return we to the extraordinary vitality manifested by the *Testudinata* under the most adverse circumstances.

A small tortoise was received in this country in the winter; in a state of hybernation, doubtless. The condition of the little animal never occurred to the recipient. The head and limbs were tucked into the shell, and he put it into the drawer with a collection of snuff-boxes, intending to have it mounted as a companion to the rest. The drawer was not opened for many months, and when it was, it smelt, as the proprietor thought, rather musty. He therefore pulled it out on a fine, warm, moist, autumnal day, exposed it to the open air on the outside of a window, and went where his business called him. When he returned, he thought he would take a look at his drawer, and as soon as he cast a glance upon it, he saw, as he thought, one of his snuff-boxes walking about. He rubbed his eyes, and looked again. His senses had not deceived him, for there was the tortoise roused from his long, long sleep, by the genial atmosphere; and, though it was not exactly in the state to make soup for a fairy alderman, it soon gained strength under kind treatment, and lived long.

The alleged length of time during which suspended animation may be continued, with the power of again resuming the functions of life, would be considered as fit only for fable were it not confirmed beyond all doubt. Hear honest and true Benjamin Franklin, who thus relates a somewhat extraordinary anecdote of some flies, which had undergone a similar fate to that of 'poor Clarence,' but with a much more happy result to some of the party:—

They had been drowned in Madeira wine, apparently about the time when it was bottled in Virginia, to be sent hither (to London). At the opening of one of the bottles at the house of a friend where I then was, three drowned flies fell into the first glass which was filled. Having heard it remarked that drowned flies were capable

of being revived by the rays of the sun, I proposed making the experiment upon these : they were, therefore, exposed to the sun upon a sieve, which had been employed to strain them out of the wine. In less than three hours two of them began by degrees to recover life. They commenced by some convulsive motions in the thighs, and at length they raised themselves upon their legs, wiped their eyes with their fore-feet, beat and brushed their wings with their hind-feet, and soon after began to fly,—finding themselves in old England without knowing how they came thither. The third continued lifeless till sunset, when, losing all hopes of him, he was thrown away.

The philosopher thus improves the occasion :—

I wish it were possible, from this instance, to invent a method of embalming drowned persons, in such a manner that they might be recalled to life at any period, however distant ; for, having a very ardent desire to see and observe the state of America an hundred years hence, I should prefer to any ordinary death the being immersed in a cask of Madeira wine, with a few friends, till that time, to be recalled to life by the solar warmth of my dear country.*

Now, Heaven forbid, that in this incredulous time any doubt should be thrown upon this comfortable story ; but I have somewhere met with another account of the extraordinary longevity of a fly. The relater, when in Germany, was promised by his host a superlative wine which had been ten years in bottle. The well-corked flask was produced, and while mine host was descanting on its age and merits, and holding it up to the light, he, to whom it was offered, beheld between his eye and the sun a fly vigorously struggling on the surface of the wine. Modest as he was, he could not resist his impulse to point out the struggler, observing that the venerable insect had, no doubt, been kept in health and vigour by the *elixir vitæ* in the bottle. The innkeeper—and this is the strangest part of the story—was abashed ; and in his confusion was surprised into a declaration that he never would tell another lie.

* Franklin's *Memoirs*, vol. ii. p. 227.

The old nursery-book told us, and told us truly, under usual circumstances, that

The tortoise securely from danger does dwell,
When he tucks up his head and his tail in his shell.

The true Terrapenes, or, as those land-tortoises are called by Jack, 'Turpins,' may defy the general chapter of accidents, though there may be no safety either for him or the poet, on whose bald head a raptorial bird may drop the reptile from on high, taking the calvarium for a stone. With a dorsal buckler, constructed principally out of eight pairs of ribs, united towards their middle by a succession of angular plates, into which the ribs are, as it were, inlaid; and a plastron or breastplate composed of nine pieces, each of which, with one exception, are pairs, the ninth being placed between the four anterior pieces, with the two first of which it generally coheres, when it is not articulated with the four, and the whole forming in the adult a strong breast-and-belly plate—compact in all its parts, and united on each side to the dorsal buckler, the whole being so framed and composed as to resist a very high degree of pressure, or a powerful blow,—the land-tortoise has only to offer the passive resistance of its defensive armour to set at nought the attacks of ordinary enemies. There is one genus of land-tortoises * which does not grow to such a size, or carry such ponderous armour, as those of the genus *Testudo*, that has a still farther safeguard against the predatory animals to whose attempts it is exposed. In this form the anterior portion of the plastron, reaching backward to the space occupied by the two first pairs of sternal plates, is susceptible of motion. Under the strongly-marked suture of the second with the third pair, is the elastic ligament which serves for a hinge. When the animal wishes to open this moveable lid, under

* *Pyxis*.

which, when closed, the head and fore-feet are closely boxed up, it lowers the lid, protrudes its head and fore-feet, and walks or feeds till danger approaches, when it draws them in, raises the lid, and thus shuts itself up in a compact box; for the edges of this operculum on hinges fit close as wax to those of the carapace, which here forms a sort of animated door-case. Thus the animal has nothing to fear in front; and behind, it is securely protected by its enlarged and deepened plastron, under which the posterior extremities and tail can be entirely and snugly drawn up. Among the marsh-tortoises* there is a similar conformation; and the species so protected have obtained the apt name of box-tortoises.

But, as if Nature were determined to show that she can vary any plan, however ingenious, she has thought fit to turn out of hand another phase of this box-like construction, and in *Kinyxis* we have it behind instead of before. The tortoises of this group are gifted with the power of moving the posterior part of their carapace, which they can lower and apply to their plastron, so as completely to close the box behind, as those of the genus *Pyxis* close the anterior part of their shells. But in *Kinyxis* there is no hinge-like apparatus as there is in *Pyxis*. In *Kinyxis* the bones bend; and, in consequence of their thinness and elasticity, the carapace can be bent down at the will of the animal, so as to approximate the plastron. A sinuous line, on which the animal mechanism operates, is indicated externally between the penultimate and ante-penultimate marginal plate; and this point, or, rather, line of flexion, is furnished with a tissue partaking of the nature of fibre and cartilage.

But which of the land-tortoises furnished the shell—the chorded shell, dear to Apollo and the Muses?

Pausanias says, that it was a species which was found

* *Sternotherus*.

in the Arcadian woods; and it very probably was that now known as *Testudo Græca*. Others declare that it was an African species (whose carapace and dried tendons gave out a sound when struck by Mercury, who found it after an inundation of the Nile) that furnished the hint for the lyre.

The *Elodians*, or marsh-tortoises, are gifted with far greater activity than their terrestrial relations. They swim with great facility, and make a much quicker march on land, leading a predatory, quisquilius, amphibious life, and frequenting sluggish streams, the lake, the pond, and the marsh. Their food consists principally of freshwater molluscous animals, tailless and tailed batrachians,* and annelids, or worm-like creatures.

The honeymoon of these elodians endures for many weeks at a certain time of the year; and their prolonged loves are blest with a goodly batch of spherical eggs, without any calcareous shell, but as white as those of the other chelonians. The nest is a shallow cavity in the earth, scraped out by the female; and the banks of the waters, wherein she spends much of her time, are generally selected; for her instinct teaches her that such a locality offers a place of security to the young, who take refuge in the waters from their numerous enemies as soon as they are hatched.

And here it may be observed that the *Chersians*, or land-tortoises, are, as a general rule, feeders on vegetables; the *Thalassians*, or sea-tortoises, commonly known as turtles, both vegetarian (in some cases almost entirely so) and carnivorous; while the *Elodians*, or marsh-tortoises, and the *Potamians*, or river-tortoises, which may both be classed under one common head, the gradation being almost insensible, are supported on animal food, the prey being generally taken in a living state. In

* *Anurous* and *urodele batrachians* of the learned.

conformity with this dispensation, the anterior extremity of the upper bill in the majority of species exhibits a large notch, and on each side of it a sufficiently strong tooth, reminding the observer of the beak of the higher raptorial birds.

In some of this group, Nature, which, in the chelonian forms that we have already noticed, had contented herself with a lid either before or behind, carries out what may be termed the box principle, by making, as in the genus *Cistudo*, a moveable lid both before and behind. In this subgenus a cartilage attaches the wide oval plastron to the buckler. This cartilage is moveable both before and behind, turning on the same transversal mesial hinge, and, at the will of the animal, presenting nothing but a well-closed box to the prying eyes of the enemy. In *Kinosternon*, also, the oval sternum is moveable before and behind on a fixed piece; but in *Staurotypus*, the thick cruciform sternum is moveable in front only. In others, again, *Platysternon* and *Emysaura*, for example, the plastron is immovable.

The *Potamians*, or true river-tortoises, whose species have been confounded under the name of *Trionyx*, have among them some which grow to a considerable size. To say nothing of one which was kept by Pennant, and weighed twenty pounds, seventy pounds have been stated as the weight attained by certain individuals. Inhabiting the streams and rivers, or great lakes of the warmer regions of the earth, their habits are generally similar. Swimming with much ease either upon or beneath the surface of the water, they pursue young crocodiles, other reptiles, and fishes, which their agility enables them to make their prey. They are also said to be great destroyers of the eggs of the crocodiles, especially in the Nile and the Ganges. The angler baits his hook for them with small fishes or other living bait, unless his skill enables him so to play a dead or artificial one as to

deceive the sharp eyes of these tortoises, whose flesh is considered very good for the table. If he goes out with proper tackle, the sport is satisfactory enough ; but one of them took the fly of a justly-celebrated singer and skilful disciple of old Izaak's school, while he was fishing for trout. He thought he had got hold of an old boat ; but, unwieldy as his prize was, he would probably have landed it if left to himself. His stupid attendant, however, rushed forward and seized the line, which, thus deprived of the spring of the rod, could not bear the strain, and the potamian got clear off.

Islets, rocks, floating timber, or the trunks of fallen trees on the banks, are the favourite places of resort to which these tortoises come for repose during the night. But they are very wary, and the least noise sends them immediately into the water. They are troublesome customers to those who are not aware of their mode of attack. When they seize their prey, or are on the defensive, they suddenly and most rapidly dart out their retracted head and long neck like lightning, biting most sharply, and rarely relaxing their hold till they have taken the piece, into which they have fixed their cutting and pertinacious bill, out. The fisherman, therefore, either cuts off their heads as soon as he has secured them, or reins them up with a sort of bridle, so as to prevent the dreaded bite ; and in this last state, I have been told, they are often exposed alive for sale in the markets.

In the months of April or May, the sandy spots on the banks of the rivers or lakes which have a good exposure to the sun are sought out by the females, as the places of deposit of their eggs, to the amount of some fifty or sixty ; and in July the young make their appearance. The patience of a German is proverbial ; with the eternal pipe in his mouth, he calmly follows out his subject, and follows it out well ; but when we find Monsieur Lesueur

patiently counting the ova in the ovary of a potamian mother, and deliberately giving the results, we pause, and thank the gods, who have disposed the mercurial mind of one of our near neighbours to quietly settle down to ovarian statistics. In the ovary of a pregnant potamian, M. Lesueur counted twenty ripe eggs, ready to come forth at the bidding of Dame Nature. Then he saw a quantity of *ova*, varying in size from that of a pin's head to the goodly volume of rotundity which they attain, when the calcareous coat, which is necessary for the protection of the egg when it is exposed to the dangers of this world, is superadded: what 'the tottles of the whole' is, may be ascertained by those who feel disposed to inquire of M. Lesueur; and if they will consult the oracle, they will rise from the consultation wiser men, unless they have sounded all the shallows and depths of testudinate life.

But enough, and, for the reader who is not zoologically disposed, more than enough. He has been led, if he has condescended to follow, from the land to the marsh, from the marsh to the lake, stream, and river, the residences of the various modifications of testudinate life. A short repose should be placed at his disposal before, in the course of our narrative, he follows these great rivers of the old and new world, in which the freshwater-tortoises disport themselves, into that ocean in which all rivers, great and small, are lost. But there, in that boundless waste of waters, we shall find that Nature has modified the Chelonian type into the Thalassian shape, which occupies a distinguished reptilian place in the present world, and in that which is gone for ever.

October, 1850.



CHAPTER XI.

THE extremities modified for walking on land in the case of the Chersians, shuffling about in marshes and ponds in the case of the Elodians,* and swimming in rivers with a good garnish of claws to enable the Potamians† to scramble upon banks and logs, to say nothing of the help of the said claws in enabling them to secure their prey, take, in the Thalassians,‡ an unmistakeable oar-like shape. No half-measures would enable a turtle to row placidly on the mirror-like sea, when

The air is calm, and on the level brine
Sleek Panope with all her sisters plays,

or beat the billows when the ocean is agitated by storms such as burst forth in tropical latitudes. But these paddles have a double office to perform. They are formed to act, not only as organs of swimming, but as instruments of progression on the tide-furrowed shore, when the females travel up to deposit their eggs; and to this end, in most of the species, the paddle is furnished with one or more nails, which greatly assist the animal in its advance on land.

Only five well-defined recent species are known, if Mr. Gray be right in considering *Chelone virgata* and *Chelone maculosa* of Dumeril and Bibron as varieties of *Chelone mydas*; and this existing state of the limitation of the marine form of these reptiles opens a new and

* Marsh tortoises.

† River tortoises.

‡ Sea tortoises, or turtles.

most interesting point of view, when compared with the fossil evidences of the development of this sub-family in the ancient seas of our globe. Professor Owen, in his valuable *History of British Fossil Reptiles*, describes no less than eleven well-defined fossil species of chelone found in Britain, to say nothing of fragments. Such a catalogue, as he justly observes, leads to conclusions of much greater interest than the previous opinions respecting the chelonites of the London clay could have suggested.

Whilst (writes the Professor) these fossils were supposed to have belonged to a freshwater genus, the difference between the present fauna and that of the eocene period, in reference to the chelonian order, was not very great; since the *Emys (cistuda) Europæa* still abounds on the continent after which it is named, and lives long in our own islands in suitable localities. But the case assumes a very different aspect when we come to the conviction, that the majority of the eocene chelonites belong to the true marine genus chelone; and that the number of species of these extinct turtles already obtained from so limited a space as the Isle of Sheppy, exceeds that of the species of chelone now known to exist throughout the globe.

The Professor comes to no hasty conclusion, when he states that the ancient ocean of the eocene epoch was much less sparingly inhabited by turtles than that which now washes the shores of our globe; and that these extinct turtles presented a greater variety of specific modifications than are known in the seas of the warmer latitudes of the present day. Nor does the inference stop here; for, as he well says in continuation, the indications which the English eocene turtles, in conjunction with other organic remains from the same formation, afford of the warmer climate of the latitude in which they lived, as compared with that which prevails there in the present day, accord with those which all the organic remains of the oldest tertiary deposits have hitherto yielded in reference to this interesting point.

We have already seen that some of the freshwater-tortoises make the eggs and young of crocodilians and other reptiles their prey, and the conformation of some of these fossils furnishes the author of the work here cited with another generalizing observation.

After remarking that abundance of food must have been produced under the influences of a climate such as that which the fossil turtles enjoyed, he proceeds to the inference that to some of the extinct species—which, like the *Chelone longiceps* and *Chelone planimentum*, exhibit a form of head well adapted for penetrating the soil, or with modifications that indicate an affinity to the *Trionyces*—was assigned the task of checking the undue increase of the now extinct crocodiles and gavials of the same epoch and locality, by devouring their eggs or their young, the trionyces themselves becoming, probably, in return, an occasional prey to the older individuals of the same carnivorous saurians. Thus did the *lex talionis* prevail long before lawyers stained paper with their well-galled ink. Thus was the balance kept up in bygone ages as it now is. The same principle of mutual extermination was, and is, and is to be; and by this principle, which to the uninitiated must wear somewhat of an Acherontic aspect, the greatest quantity of general happiness is secured in what would otherwise be an overcrowded world: but *væ victis*.

The well-arched, thick-walled, waggon-proof, portable castle, assigned by the distributive justice of Nature to the larger slow land-tortoises, and those, consequently, more exposed to observation and attacks, is in the turtles modified to suit the element in which they principally live. The carapace forming the roof is less highly arched, and both it and the floor or plastron are lighter and less completely ossified; but as the head cannot be drawn back under the carapace, as in the land-tortoises, it is fortified by an additional bony helmet.

Besides these true turtles another marine genus exists, differing remarkably from chelone ; this is the coriaceous turtle, *Sphargis*, which has the body incased in a sort of leathern armour, and has no nails on the paddles. This form seems to represent the soft freshwater-tortoises in some degree.

The green turtle (*Chelone mydas*), now the cynosure of every aldermanic eye, owes its English name to the hue of the delicate fat which enriches the soup and various savoury dishes that form a course of turtle. Whether the Latin specific name was conferred on it by the Knight of the Polar Star from any punning judiciary allusion, does not seem to be certain. Notwithstanding the French names with which it is now the fashion to adorn every *plat*, be it at City feast, great club dinner to the lion of the day, or the more refined repast served in the Apollo chamber of a modern Lucullus, England may claim the honour of availing itself of the resources of its West Indian possessions, and making 'turtle' famous. The French were a long way behind. In *Le Cuisinier des Cuisiniers** there is not a single receipt for dressing real turtle.

What the ideas of a Frenchman on the subject of *Potage en Tortue* were, may be gathered from the following :—

Potage en Tortue.—Ce potage, qui est aujourd'hui très à la mode dans les grands maisons et chez les bons restaurateurs, manque dans la plupart des traités sur la cuisine. Beauvilliers, et Viard dans le *Cuisinier Royal*, sont les seuls qui en exposent la recette, mais avec des variantes.

After this exordium, one is hardly prepared for the receipts themselves.

Matières employées par Beauvilliers.—Mouton, épaule ou gigot, ou parures de carrés, débris de poissons, en quantité suffisante, dans un marmite, blond de veau, bouquet de persil, aromates,

* Paris, 1825.

basilic ; la cuisson sépare la chair des os. Le bouillon passé au travers d'une serviette, et clarifié avec des blancs d'œufs ; faire bouillir, réduire, ajouter du vin de Madère ; la moitié d'une tête de veau, echaudée de la veille, désossée, cuite dans un blanc, coupée par petits morceaux ; dans le bouillon, vin de Madère ; poivre de cayenne, de kari ; dans le potage, des morceaux de veau ; jaunes d'œufs frais, durcis, à l'instant du service.

Now for the *Matières employées par Viard* :—

Tranches de bœuf, parure de veau, poule ou parure de volaille, moitié consommé et moitié blond de veau, carottes, oignons, cloux de girofle, dans une marmite ; moitié de tête de veau, degorgée et blanchie, coupée par petits morceaux dans une autre marmite, petits piments enragés, macis de muscade, consommé, vin de Madère, champignons, ris de veau en très petits morceaux, crêtes de coqs, rognons, quenelles de volailles ; dans la souprière, œufs pochés et le potage dessus ; si le potage n'est pas assez corsé ou assez fort en piment, glace de volaille, beurre de piment.

Fire burn and caldron bubble !

Very good *potage*, no doubt—but no more like *tortue* than I to Hercules ; and, even for the mock-turtle here presented, any one may safely back Birch of Cornhill against the French artist. When Cuvier last visited this country, and was feasted by some of our philosophers at the Albion, nothing struck him so much as the *tortue*, upon which his memory long dwelt ; and yet he had had the opportunity of testing the abilities of the first cooks of his own country. Soyer and other compatriots of his may have shone since that time ; but formerly turtle was eminently English. Nor is it of remote antiquity as an English dish. Not much more than a hundred years have passed since its general introduction, and for a long time it was comparatively rare. But steam, which annihilates both space and time to make epicures as well as lovers happy, now brings a regular and rapid supply of really 'fine lively turtle,' very different from the wasted invalids which our West Indiamen of the olden time landed after their lagging voyage. Bristol was famous for it ; and some years ago the Montague Tavern bore

away the bell. There was the best turtle I ever tasted, and thither did George IV. send for that which graced his royal table. Whether the mantle has descended on the shoulders of the present priest of Comus who officiates at the Montague, those of my readers, if I happen to have any, may ascertain who go to that ancient town, and make a pilgrimage up the hill to the 'Parade,' which used to be odoriferous with the savoury emanations from the tavern redolent of sweet basil, the grosser fumes of the kitchen sublimed by the perfume of *lime-punch*, *lime-sangaree*, and *limes* themselves: accompaniments, by the way, rarely, if ever, seen in London; where the lemon, fragrant as it is, unsatisfactorily does duty for the lime, two or three of which supreme condiments were placed in the napkin of every guest when turtle was presented at Bristol.

Our own lamented Chantrey, who, though fully alive to the merits of the good things of this world, was one of the most unselfish and liberal of men, had a story of a passage during one of the City feasts at which he was present. The great national sculptor—for truly great and truly national he was—sat next to a functionary before whom stood a large tureen of turtle-soup. This citizen instantly possessed himself of the ladle, carefully fished out the coarser parts, and offered the plate containing them to Chantrey, who declined.

'I watched,' said he, 'the progress of the plate: at last it was set down before the Lord-mayor's chaplain; and the expression of that man's face, when he beheld it, I shall never forget.' The functionary went on helping till he had cleared the soup of all but the green fat and richer parts, the whole of which he piled up in a capacious plate for himself. Then up spoke our sculptor and said,—'If you will allow me to change my mind, I'll take a little turtle;' and the waiter who held the plate placed it, to the horror of the dispensing expectant,

before Chantrey, who immediately commenced spoon-exercise, as Jonathan delicately describes such evolutions; 'and this I did,' said Chantrey, 'to punish him for his greed.'

What was the unhappy functionary to do? His own tureen was exhausted, and, in a half-frantic tone, he called to one of the waiters to bring him some turtle. But at City feasts the guests are very industrious, especially when turtle is the order of the day; and the waiter, after trying about, brought back to our greedy citizen the identical plate of fatless flesh which had so astounded the chaplain, who had contrived to exchange his unwelcome portion for one more worthy of a sleek son of the Church: 'and then,' Chantrey would add, 'my attentive neighbour's visage was awful to look upon!' There was no help for it; so the disconcerted functionary betook himself to the rejected plate, with the additional discomfiture of seeing Chantrey send away his, still rich with calipee, fat, and fins.

But this is mild, compared with scenes which have arisen on such occasions in less refined times. Something, indeed, may be allowed for the weakness of human nature, and the excitement of the moment, when

The tender morsels on the palate melt,
And all the force of cookery is felt.

But time was when the Graces seem to have been altogether banished from the great civic feasts, and the onslaught of the gastrophilists waxed fast and furious. Hogarth has touched this in the eighth plate of his inimitable *Industry and Idleness*, when the industrious apprentice has grown rich, and is Sheriff of London; 'representing to us,' as worthy Dr. Trusler observes, 'at one view, the various ways of what we call laying it in.' Quin declared that it was not safe to sit down to a feast in one of the City halls without a basket-hilted knife and fork

At a much later period, a well-known 'special attorney,' who had fought his way well on every other stage, found himself no match for those who surrounded him on Lord-mayor's Day. Whenever he endeavoured to transfer a fat slice from the savoury haunch before him to his own plate, it was instantly speared by the forks of the foragers near him, and borne away to theirs, till at last he was compelled to resign the unequal contest, and lay down his dinner arms in despair, though he had got well into 'The Alderman's Walk.' And yet civic hospitality does its best to enable the catechists who are invited to do their duty towards their neighbours, as far as plenty is concerned. At a turtle-feast, the usual allowance was, perhaps is—for there has been no falling off of late in festal liberality—six pounds, live weight, per head. Thus, in August, 1808, at the Spanish dinner, at the City of London Tavern, 400 guests consumed 2500 lbs. of turtle, if the newspapers of that day are worthy of credence. When we remember that the turtle is but the prologue to the play, we may form some notion of the performances of these valiant trenchermen, who must have gone near to rival the feats of some of the ancient heroes of the table. They, indeed, have left on record gastric achievements to be envied by aldermen of the most giant appetite. Did not Maximin consume forty pounds of flesh in a day—nay, occasionally sixty pounds—moistening his repast with a vessel of wine of the Capitol measure, containing about eight of our gallons? Great as he was in more senses than one, the brutal emperor, however, must yield the palm to Phagon, who at one dinner consumed a whole boar, a hundred loaves, a wether, and a little hog, washing all down with more than an orca of wine. Claudius Albinus seems to have had a sweet tooth, and a more refined taste; for one of his meals consisted of five hundred dried figs, the calli-struthiæ of the Greeks, one hundred Campanian peaches,

ten melons of Ossia, and twenty pounds of grapes from the luscious vineyards of the blessed Island of Leuce, that paradise of the Euxine Sea. These delicacies paved the way for the *volaille*, consisting of one hundred gnat-snappers; and then the orifice was satisfactorily closed upon forty oysters. Claudius, in this sweeping supper, seems to have reversed the modern order of dishes, ending where an epicure of the nineteenth century begins. What his drinking capabilities were, does not appear. But the stern Romans were in the habit of becoming somewhat hazy occasionally. People do not like to have their various weaknesses paraded before the senate; and Mark Antony bitterly paid off Cicero's philippics. The son of the orator, by way of commentary, and bent on eclipsing the fame of his father's murderer as the greatest bibber of the empire, took off two gallons at a draught. Nivellius Torquatus threw the prowess of Marcus Cicero into the shade; for, in the presence of Tiberius, he drank off three gallons without drawing breath; and Firmus disposed of two buckets-full of wine without flinching; to say nothing of Offellius Burætius, who spent the whole of his life in making himself a thoroughfare for wine. The accomplishment was worth something in those days. Three bacchanalian nights with Piso so endeared him to Tiberius—whom the wags irreverently called Biberius—that he made him prætor; and for the same convivial qualities, the emperor gave Pomponius Flaccus the province of Syria. The road to preferment generally, under his reign, seems to have been the same rosy way, for 'He also did prefer a man that was unknown, and sought for the quæstor's office, before the most noble men, for pledging at a banquet an amphora of wine, that he drank to him. And at that time, when the *Lex Fannia* was published, the matter was come so far, that many of the people of Rome would come drunk into the senate-house, and so consult of the affairs of the common-

wealth.* Man is an imitative animal; and the debates in our own houses of parliament occasionally exhibit symptoms that some of our legislators have dined, though they may not have exactly fulfilled that Greek symposial law, that required the boon companion not to quit his cups till the morning star arose. Even in these degenerate days, there are not wanting examples of those who have bid the liquid ruby flow copiously. Quin frequently carried off six good bottles of claret under his belt, after all the spirituous and vinous accompaniments of a turtle dinner.

But neither calipash nor calipee gratified the palates of the ancient Romans. The hammer of Charon descended upon the Apicii and Lucullus centuries before the Nereids, who sport under the beams of the western star, sent the delicious offering to the epicures of the old world, although the sea-nymphs of the East furnished the luxurious with an ornament for their tables, couches, and the pillars of their houses, from another species.† We can almost hear the lamentations of the fidgety, niggardly, self-tormenting Mamurra, poor in the midst of his riches, who

Testudineum mensus quater hexaclinon
Ingemuit citro non satis esse suo.‡

The consumption of tortoiseshell at Rome for ornamental purposes must have been very great; the very door-posts of the rich were inlaid with it.§

* Jonston.

† *Chelone imbricata*.

‡ Martial, *Epig.* ix. 60. Juvenal also alludes to the luxury in his eleventh Satire:—

Nemo inter curas et seria duxit habendum,
Qualis in Oceani fluctu testudo nataret,
Clarum Trojugenis factura, ac nobile fulcrum.

§ Familiar as is the passage, we cannot mar the beauty of the Mantuan's verse by giving the sixth line alone:—

O Fortunatos nimium sua si bona norint
Agricolae! quibus ipsa procul discordibus armis,

The supply, occasionally, must have been more than equal to the demand, if we may believe Velleius Paterculus, who relates that, when Cæsar took Alexandria, the magazines were so rich in tortoiseshell, that he proposed to make that highly-prized ornament a principal feature in his African triumph.

The first man that invented the cutting of tortoise shells into thin plates, therewith to seele beds, tables, cupboards, and presses, was Carbilus Pollio, a man very ingenious and inventive of such toies, serving to riot and superfluous expense.*

The carapace entire was frequently used for a cradle and a bath for young children; nor did the warrior disdain it as a shield.

The size to which some of the species grew was enor-

Fundit humo facilem victum justissima tellus.
 Si non ingentem foribus domus alta superbis
 Mane salutantum totis vomit ædibus undam;
Nec varios inhiant pulchrâ testudine postes,
 Inlusasque auro vestes, Ephyreïaque æra;
 Alba neque Assyrio fucatur lana veneno,
 Nec casia liquidi corrumpitur usus olivi:
 At secura quies, et nescia fallere vita,
 Dives opum variarum, at latis otia fundis,
 Speluncæ, vivique lacus, at frigida Tempe,
 Mugitusque boum, mollesque sub arbore somni
 Non absunt.

* Holland's Pliny. And again,—' Cornelius Nepos writeth, that before the victory of Sylla, who defeated Marius, two dining tables, and no more there were throughout Rome, all of silver. Fenestella saith, that in his time (and he died the last yere of the reigne of Tyberius Cæsar the Emperor) men began to bestow silver upon their cupboards and side livery tables: and even then also (by his saying) tortoise worke came in request, and was much used. Howbeit, somewhat before his daies, he writeth, that those cupboards were of wood, round and solid of one entire piece, and not much bigger than the tables whereupon men eat their meat; but when hee was a young boy, they were foure square, and of many peeces joyned together; and then they began to be covered over with thin boards or painels, either of maple or citron wood.' So that, after all, this is not the only *age of veneer*.

mous, if we are to hold Ælian, Pliny, Diodorus, and others, worthy of belief.

There he found Tortoises in the Indian sea so great, that one only shel of them is sufficient for the rouse of a dwelling house. And among the Islands principally in the Red Sea, they use Tortoise shells for boats and wherries upon the water.

And, again (book vi. c. 22), Pliny, writing of the inhabitants of the Island of Taprobane, states that,

They take also a great pleasure and delight in fishing, and especially in taking of tortoisses; and so great they are found there, that one of their shells will serve to cover an house: and so the inhabitants do employ them instead of rouses.

The largest skull of a turtle I ever saw is in the noble museum of the Royal College of Surgeons of England. It is the cranium of a Loggerhead turtle (*Chelone caou-anna*), and is of the following portentous dimensions:—

	Ft.	In.	Lin.
Length, in a straight line from the back margin of the mastoid to the fore end of the pre- maxillary	0	13	6
Breadth in a straight line	0	11	6
Height, including lower jaw	0	9	0
Circumference (horizontal)	3	4	0

And now a few words on the natural history and capture of some of these Thalassians; and first, of the delicate species, the greenish colour of whose fat gives it one of its names, and is derived from the turtle-grass on which it principally feeds—the green turtle, *Tortue franche* of our pseudo-republican neighbours; *Testudo mydas*, Linn.; *Chelone mydas* of more modern zoologists.

The Atlantic Ocean and the West Indian seas are enriched with this luscious esculent.

Turtle (tortoises), writes Sir Hans Sloane, are of several sorts; those of the sea call'd green Turtle, from their fats being of that colour, feed on conches or shell fish, are very good victuals, and sustain a great many, especially of the poorer sort of the Island. They are brought in sloops, as the season is for breeding or feeding, from the Caymanes, or south Cayes of Cuba, in which forty sloops,

part of one hundred and eighty, belonging to Port Royal, are always employed. They are worth fifteen shillings apiece, best when with egg, and brought or put into pens, or palisadoed places, in the harbour of Port Royal, whence they are taken and killed as occasion requires. They are much better when brought in first, than after languishing in those pens for want of food.

Apicius certainly had Darteneuf on the hip when, in reply to the strictures of the latter on his not having made a voyage to Britain for the purpose of eating oysters, the ghost of the Roman retorted with the modern epicure's short-comings on his confession that, when in the flesh, he had not been to the West Indies to enjoy turtle.*

Sloane gives a somewhat startling account of the effect of a turtle diet:—

They infect the blood of those feeding on them, whence their shirts are yellow, and their skin and face of the same colour.

Our aldermen had better have an eye to their linen

* *Apicius*. What grieves me most is, that I never eat a *Turtle*. They tell me that it is absolutely the best of all foods!

Darteneuf. Yes, I have heard the Americans say so: but I never eat any; for in my time they were not brought over to England.

Apicius. Never eat any turtle! How didst thou dare accuse me of not going to Sandwich to eat oysters, and didst not thyself take a trip to America, to riot on *turtles*? But know, wretched man, that I am informed they are now as plentiful in England as sturgeon. There are *turtle-boats* that go regularly to London and Bristol from the West Indies. I have just seen a fat alderman, who died in London last week, of a surfeit he got at a *turtle feast* in the City.

Darteneuf. What does he say? Does he tell you that *turtle* is better than *venison*?

Apicius. He says there was a haunch of venison untouched, while every mouth was employed on the turtle: that he eat till he fell asleep in his chair, and that the food was so wholesome, he should not have died, if he had not unluckily caught cold in his sleep, which stopped his perspiration and hurt his digestion.

Darteneuf. Alas! how imperfect is human felicity, &c.

Lyttelton's Dialogues of the Dead. 3d edit. 1760.

and complexions. Sloane starts a theory on the colour of his Transatlantic friends, whose under-garments were 'stained prodigiously:—

This, I believe (says he), may be one of the reasons of the complexion of our European inhabitants, which is chang'd, in some time, from white to that of a yellowish colour, and which proceeds from this, as well as the jaundies, which is common, sea air, &c.

And then he says, not without truth, that 'all sorts of Sea Turtle, except the green, are reckon'd fishy and not good food.'

In his chapter 'of Quadrupeds, which are oviparous, or lay eggs,' he says,—

The best, or green turtle or tortoises, come to the Caymanes once a-year to lay their eggs in the sand, to be hatch'd by the sun, and at that time the turtlers take them in great numbers; at other times the turtles go to the south Cayes of Cuba, there to feed on the sea grass growing under water, wherefore the turtlers go thither in quest of them; and it may be, four men in a sloop may bring in thirty, forty, or fifty turtles, worth seventeen or eighteen shillings a-piece, more or less according to their goodness. The female with egg is reckon'd the best; they sometimes get their loading in a day, but are usually six weeks in making the voyage; they feed on turtle, bisquet bread and salt: they catch the turtle with nets of yarn larger than whipcord. When they come home they put them into the sea in four square penms, or palisadoed places, where they keep alive till there be occasion to kill them, which will be very long sometimes, tho' the sooner they are kill'd after taking, they are the fatter. The callipee, or under part of the breast and belly bak'd, is reckon'd the best piece—the liver and fat are counted delicacies.

And then Sir Hans proceeds to repeat, as he has in another part of his book, besides that above quoted, the statement that those who feed much upon them discharge at their pores a yellow serum, and that the fat is yellow, tastes like marrow, and gives the skin a yellow hue,—a statement which will not surprise those who know that the bones of pigs, in whose food madder is mixed, become coloured accordingly.

Such is Sloane's account of the *Testudo marina vul-*

garis of Ray; *Jurucua Brasiliensibus*, and *Tartaruga Lusitanis*, of the same; *Tortue franche* of Rochefort, Du Tertre, and Labat.

He then describes the *Testudo marina Caouanna dicta*, *Tortue caouanna*, Rochef., Labat, Ray, *Kaouanne* of Du Tertre, calling it the *hawks-bill turtle*, describing it as 'very little differing from the common sea sort, only in every part less,' and 'not so good victuals as the former, though as common in these seas.' This is probably the *Loggerhead turtle* of authors.

Sloane then gives an account of the *Testudo caretta dicta*, which I take to be the true *hawks-bill turtle*, and of which, he says, they 'are chiefly valued for their scales, commonly call'd tortoiseshell; and are found with the others.'

Père Labat speaks of *la tortue franche*, the green turtle, as 'la seule espèce qui soit véritablement bonne à manger;' of *le caret*, the *hawks-bill*, as furnishing 'écaille de tortue:—'sa chair,' he adds, 'n'est pas bonne à manger;' he speaks of it as 'd'une qualité purgative,' as the good father found to his cost; and indulgence in it nearly cost a reverend brother his life.

Of *la caouanne*, the *loggerhead*, he writes with more correctness than Sloane, who probably saw only young specimens, that it is 'plus grande que les deux autres. Son écaille ne vaut rien. Sa chair n'est pas meilleure, elle est toujours maigre, filasseuse, coriace, et de mauvaise odeur. On ne laisse pas de la saller pour les Nègres, à qui tout est bon.'

It is, perhaps, too much to say, that the tortoiseshell of the *loggerhead* is entirely worthless, though it is comparatively valueless; and, indeed, that of the *hawks-bill* is very inferior to the true article produced by *Chelone imbricata*.

Labat tells us, that those who go to the turtle islands or other localities to fish for the green and *hawks-bill tur-*

bles, live on the flesh of turtles only for three or four months, without bread, without cassava—with nothing, in short, but the fat and lean of those animals; and he declares that, whatever maladies these men may have when they set out upon this expedition, even if they should be affected with the most loathsome, they return perfectly cured.

He describes at some length the methods of capture. The first is, to watch them when they go to lay their eggs* in the sand, or when they come to reconnoitre; and he says, that if their traces are observed on the sand, and the observer go to the same place on the seventeenth day afterwards, he will infallibly find the turtle come for the purpose of depositing her burden. She is then turned on her back, and being unable to regain her usual position, is safe. But though a green turtle thus turned is secure, because her carapace is comparatively flat, a hawks-bill left in such a posture is no more safe than a Galapagos tortoise when laid on its back, because the carapace of the hawks-bill is more convex, and the animal itself more active; the operator, therefore, after turning the turtle, places great stones round it, so as to counteract its efforts to regain its natural posture, or, as the hawks-bill is only sought for its shell, the flesh being comparatively worthless, it is killed on the spot.

The worthy father gives a hint to turtle-turners to beware of their jaws, for they bite, particularly the hawks-bill (*caret*), furiously; and if they cannot take out the piece, will not let go while they have life. The turtle-turners, therefore, carry a little bludgeon with them, with which they give the patient a rap on the head before they proceed to turn it.

* According to Labat, a turtle of ordinary size lays as many as two hundred and fifty eggs, of the size of tennis-balls, and as round. The white, he says, never hardens, however long it may be submitted to cookery, but the yolk becomes hard, like that of the common fowl.

The second method of taking them is by striking them with a sort of spear or harpoon (*varre*) when they come to the surface to breathe, or there lie asleep. The adventurers go at night generally, where they have observed much cut turtle-grass floating, for that is a certain sign that the place is the haunt of turtles, who cut the grass in feeding, and some of it rises to the surface. The rest shall be told in the words of the graphic narrator:—

Celui qui tient la *varre* est sur le bout ou la proue du canot. Le mot de *varre* est Espagnol, il signifie une gaule ou perche ; celle dont on se sert en cette pêche est de sept à huit pieds de longueur et d'un bon pouce de diamètre, à peu près comme la hampe d'une hallebarde. On fait entrer dans un des bouts un cloud carré de sept à huit pouces de long y compris la douille dont il fait partie, cette douille a une boucle ou anneau de fer, ou simplement un trou, où est attachée une longue corde proprement roulée sur l'avant du canot, où un des bouts est aussi attaché, et la hampe est aussi attachée à une autre petite corde dont le varreur tient un bout. Le varreur donc étant debout sur l'avant du canot, la *varre* à la main droite, examine tout autour de lui s'il voit paroître quelque tortue, ce qui est assez aisé dans la nuit, parce qu'on voit bouilloner la surface de l'eau à l'endroit où la tortue veut lever la tête pour souffler, ou si la tortue dort sur l'eau, ou qu'un mâle soit attaché à une femelle, ce qu'on appelle un cavalage, l'écaille qui reluit et qui réfléchit la lumière de la lune ou des étoiles la lui fait appercevoir aussitôt, à quoi on doit ajouter que dans les nuits les plus obscurs, il reste toujours sur la surface de la terre et des eaux un peu de lumière qui est suffisant à ceux qui se couchent sur le ventre pour voir à une distance assez considérable autour d'eux. Dès qu'il apperçoit la tortue, il marque avec le bout de sa *varre* à celui qui conduit le canot, le lieu où il faut aller ; et quand il est à portée de la tortue il la *varre*, c'est à dire, il la frappe et la perce avec le cloud qui est anté dans la hampe. Aussitôt que la tortue se sent blessée, elle fuit de toutes ses forces, et elle entraîne avec elle le canot avec une très grande violence ; le cloud qui est entré dans son écaille ne la quitte pas, et le varreur qui a retiré sa hampe, s'en sert pour enseigner à celui qui est à l'arrière où il doit gouverner. Après qu'elle a bien couru les forces lui manquent, souvent même elle étouffe faute de venir sur l'eau pour respirer. Quand le varreur sent que la corde mollit, il la retire peu à peu dans le canot, et s'approchant ainsi de la tortue qu'il a fait revenir de l'eau, morte ou extrêmement affai-

blée, il la prend par une partie et son compagnon sur l'autre et ils la mettent dans le canot, et en vont chercher une autre.

Il n'est pas nécessaire qu'il y ait des ardillons au fer de la varre, ni que le varreur fasse entrer le fer guères plus avant que l'épaisseur de l'écaille, parce qu'aussitôt que la tortue sent la douleur que le cloud lui fait en perçant son écaille, elle se resserre de telle façon qu'on a bien plus de peine à retirer le cloud qu'on en avoit eu à le faire entrer.

The great rapidity with which one of these reptiles will run away with a boat ceases to be surprising when it is remembered, that they are frequently found three feet and a half or four feet long, and two feet or two feet and a half wide, weighing three hundred pounds, and often more. Labat, who makes this observation, remarks, that it is astonishing that wherever they are set down on land on their plastron, however distant they may be from the sea, to the sea they go without seeking about, without hesitation, and in the most direct line. The jolly Jesuit relates, that he sometimes had the pleasure of bestriding a turtle with another person, when it carried them without difficulty, and sufficiently fast.

Mais (he adds) c'est une voiture des plus rudes, car comme elle ne peut se soutenir sur ses quatre pattes toute à la fois, elle élève le train de devant, et semble égratigner la terre en s'élançant, pendant que les pieds de derrière poussent en avant en faisant un effort qui produit un mouvement qui secoue et qui fatigue infiniment.

He tells a story of an Indian, slave to M. de la Char-donnière. The slave was alone in a small canoe fishing with a line, when he saw a turtle asleep on the surface of the sea. He quietly approached, and passed a noose of a stout cord which he chanced to have with him round one of the paddles of the turtle, the other end of the cord being made fast to the bow of the canoe. The turtle awoke, and set off with all speed, and at first the Indian was under no apprehension at the rapidity with which he was carried out to sea. Sitting in the stern of his canoe, he steered with his paddle so as to avoid the waves,

hoping that the turtle would either get tired or be suffocated. But, alas! he got capsized, or, as Jack says, turned the turtle, losing his paddle, his knife, and all his fishing-tackle. Active as he was, he had all the difficulty in the world to right his canoe. While he was hard at work doing this, the turtle was acquiring fresh strength and vigour, and when he had righted his little bark it was soon upset again. In short this happened nine or ten times within a day and two nights, during which he was towed by the turtle without the possibility of cutting or detaching the cord. At last this tartar of a turtle got tired, and as good luck would have it, made for a shoal, where the Indian managed to kill it, being himself half dead with hunger, thirst, and fatigue.

The third mode of capture noticed by Labat is by setting nets, coloured red, so that the turtles may not detect them, near the sandy shores where they go to lay their eggs; and he was present when, in the evening, the nets were spread for a *grande pêche*. He describes the nature of their oil or fat to be so penetrating, that if it is placed on one side of the hand, and rubbed in with a hot cloth, it will make its way to the opposite side, and praises it as excellent for rheumatism.

Catesby, in his *Natural History of Canada, Florida, and the Bahama Islands*, says:—

The sea-tortoise is by our sailors vulgarly called turtle, whereof there are four distinct kinds: the green turtle, the hawksbill, the loggerhead turtle, and the trunk turtle. They are all eatable; but the green turtle is that which all the inhabitants in America, that live between the tropicks, subsist much upon. They much excel the other kinds of turtle, and are in great esteem for the wholesome and agreeable food they afford.

Catesby was a good observer, and his information may be generally relied on. He tells us that all sorts of turtle, except the loggerhead, are timorous, and make little resistance when taken; but that all the kinds during the season of love are very furious and regardless of

danger. The male and female, he says, usually remain together about fourteen days.

After describing the structure of the limbs as more fitted for swimming than walking, he remarks, that

They never go on shore but to lay their eggs, which is in April; they then crawl up from the sea, above the flowing of high water, and dig a hole above two feet deep in the sand, into which they drop in one night above an hundred eggs: at which time they are so intent on nature's work, that they regard none that approach them, but will drop their eggs in a hat if held under them; but if they are disturbed before they begin to lay, they will forsake the place and seek another. They lay their eggs at three, and sometimes at four, different times, there being fourteen days between every time. * * When they have laid their compliment of eggs, they fill the hole with sand, and leave them to be hatched by the heat of the sun, which is usually performed in about three weeks.

His description of the mode of capture varies little from that of Labat, except that he says nothing of nets.

The inhabitants of the Bahama Islands, by often practice, are very dexterous in catching them, particularly the green turtle. In April they go in little boats to the coast of Cuba, and other neighbouring islands, where, in the evening, especially in moonlight nights, they watch the going and returning of the turtle to and from their nests; at which time they turn them on their backs, where they leave them and proceed on turning all they meet, for they cannot get on their feet again when once turned. Some are so large that it requires three men to turn one of them. The way by which turtle are most commonly taken at the Bahama Islands, is by striking them with a small iron peg of two inches long; this peg is put in a socket at the end of a staff twelve feet long. Two men usually set out for this work in a little light boat or canoe; one to row and gently steer the boat, while the other stands at the head of it with his striker. The turtle are sometimes discovered by their swimming with their head and back out of the water; but they are oftenest discovered lying at the bottom, a fathom or more deep. If the turtle perceives he is discovered, he starts up to make his escape, the men in the boat, pursuing him, endeavour to keep sight of him, which they often lose, and recover again by the turtle putting his nose out of the water to breathe; thus they pursue him, one paddling or rowing, while the other stands ready with his striker. It is sometimes half-an-hour before he is tired; then he sinks at once to the bottom, which gives them

an opportunity of striking him, which is by piercing the shell of the turtle through with the iron peg, which slips out of the socket, but is fastened by a string to the pole. If he is spent and tired by being long pursued, he tamely submits when struck to be taken into the boat or hauled ashore. There are men who by diving will get on their backs, and by pressing down their hind part, and raising the fore part of them by force, bring them to the top of the water, while another slips a noose about their necks.

There is nothing new under the sun. Hear Pliny through the quaint pen of Philemon Holland:

Many waies the fishermen have to catch them, but especially in this manner: they use in the mornings, when the weather is calm and still, to flote aloft upon the water, with their backs to be seen all over; and then they take such pleasure in breathing freely and at libertie that they forget themselves altogether; insomuch as their shell in this time is so hardened and baked with the sun, that when they would they cannot dive and sinke under the water again, but are forced against their wills to flote above, and by that meanes are exposed as a prey unto the fishermen. Some say that they go forth in the night to land for to feed, where with eating greedily they be wearie; so that in the morning, when they are returned again, they fall soon asleep above the water, and keepe such a snorting and routing in their sleepe, that they bewray where they be, and so are easily taken: and yet there must be three men about every one of them; and when they have swom unto the tortoise, two of them turn him upon his backe, the third casts a cord or halter about him, as hee lyeth with his belly upward, and then is he haled by many more together to the land.

In the South Seas skilful divers get under the turtles, and surprise them when so floating.

The spirit-stirring salmon-hunt in *Redgauntlet* is familiar to every reading Briton, and so ought to be Mr. Darwin's most interesting *Journal*. There, in his account of Keeling Island, will be found an animated description of a turtle-chase. On the 6th April, 1836, he accompanied Captain Fitz-Roy to an island at the head of a lagoon. The exceedingly intricate channel wound its way through fields of delicately-branched corals. Several turtles were seen, and two boats were then employed in catching them. The water was so

clear and shallow that, although the turtle at first dived quickly out of sight, the pursuers in a canoe or boat under sail, after no very long chase, came up to it. At that moment a man standing ready in the bows dashed through the water upon the turtle's back, and clinging with both hands by the shell of the neck, was carried away till the animal became exhausted and was secured. We may easily fancy that it was, as Mr. Darwin says, quite an interesting chase, with the two boats doubling about, and the men dashing into the water endeavouring to seize their prey.

But in the Oriental seas a still more curious mode of taking turtle is recorded by safe authors.

Many have heard of the *Remora*, a fish whose *vis inertiae* was, in old times, believed to be sufficient to stop an argosy if it attached itself to the ship. The fishermen take with them in their small light boat, a tub containing a supply of these fishes. It is necessary to premise, for the edification of those who are not acquainted with the organization of a remora, that there is an oval plate at the top of its head, with a soft fleshy circumference. Within this is a very remarkable apparatus of firm pieces or plates, disposed in two regular rows across the top of the head. These pieces are capable of movement on their axis by the aid of appropriate muscles, as the laths of moveable wooden blinds are made to turn so as to exclude the sun's rays by pulling the adjusting string, or like the plates of the new glass ventilators. The free edges of the plates of the remora, which in different species of the genus vary from fifteen to thirty-six, are armed with small hooks, which can be all raised at once like the teeth of a wool-card. Well, to the tail of each of these living tackles in the tubs is fastened a ring, ready for the attachment of a cord, which, though fine, is long and strong. All being ready, the fisherman bides his time till he gets sight of a turtle

comfortably basking in a dozy state on the surface, within the proper distance. Noiselessly, then, does he slip one of his corded remoras overboard, and the fish, ill-provided with fins for an enduring swim, makes instantly for the turtle, while the fisherman, almost afraid to draw his breath, pays out the line. Away goes the remora, without stop or stay, till it anchors on the plastron of the slumberer. The fisherman remembers the patient demeanour required by all of his craft, and 'gives time.' When he thinks the marine squatter has made a comfortable settlement he hauls away, and the surprised turtle finds itself on board the boat, where a push applied from behind forwards detaches the remora, when the turtle is laid upon its back, *secundum artem*, at the bottom of the boat, and the remora is returned to its tub; burning, no doubt, cold-blooded as it is, to relate its adventure, and the uncompromising treatment to which it has been subjected.

How many mortals are treated by the great like this poor remora, and, having secured the prize for them, are returned to their tub till 'next time'?

But to return to Catesby. After a short account of the hawks-bill, he says of the loggerheads that they are the boldest, the most voracious, and the foulest feeders of all the turtles.

They range (says he) the ocean over; an instance of which, amongst many that I have known, happen'd the 20th of April, 1725, in the latitude of thirty degrees north, when our boat was hoisted out, and a loggerhead turtle struck as it was sleeping on the surface of the water. This, by our reckoning, appeared to be midway between the Azores and the Bahama Islands, either of which places being the nearest land it could come from, or that they are known to frequent; there being none on the north continent of America farther north than Cape Florida. It being amphibious, and yet at so great a distance from land in breeding time, makes it the more remarkable. They feed mostly on shell-fish; the greater strength and hardness of their beaks enabling them to break very large shells, particularly the *Buccinum*, pieces

of which I have taken out of their stomachs, and have seen fractures upon large shells, which the turtlers told me were caused by turtles.

Of the trunk turtle (sphargis) he says that it is rarely taken; indeed, he does not appear to have seen one in those latitudes, though he 'was told they grow to a very large size:' but, as he opens his description of these animals by saying that they are all eatable, though he qualifies it afterwards by stating that the flesh of the trunk turtle is rank, but affords a large quantity of oil, Pennant's anecdote relative to one of the three which were captured off the coast of Scarborough, about a hundred years since, should not be forgotten. It was purchased by an Amphitryon, who invited several guests to feast on turtle; but there was a sage among them who knew something of the matter in hand, and warned the company of the consequences, who, though looking somewhat blank, took his advice, with one exception. That sturdy gastrophilist would not be baulked of his meal, and shovelled away till he was seized with symptoms very like those of cholera, which brought him to death's door. And yet Pennant, who was as accomplished an antiquary as he was a naturalist, tells us, that the Carthusians eat no other species; but the stomach of a monk and that of a sailor will digest anything.

Dr. Patrick Browne, in his *Natural History of Jamaica*, mentions the hawks-bill, the green turtle, and the loggerhead only. Of the first he says, that its flesh is not so delicate, nor so much esteemed, as that of the green turtle, though frequently used in all parts of America; but its scales are the most valued, being generally the thickest and best coloured. Of the second, he states that it is delicate tender food while young, but that as it grows old it becomes more tough and gristly; and he is right. The juices, he observes, are generally reckoned great restoratives; and he adds, that they heal

and smooth the skin in scorbutic and leprous habits, and are said to cure even the most obstinate taints.

The loggerhead from which his description was taken was caught near the Western Islands, many leagues out at sea. The back was covered with what he calls moss, and with barnacles; a crab, which he figures as big as a walnut, was found sticking in the wrinkles in the hinder part of the body. The intestines, he adds, 'were full of galateas and medusas, which, with a few branches of some sea-weeds, made up all its nourishment; yet it was fat and rich, but of a strong, rank, fishy taste. I eat some, and it agreed pretty well with my stomach.'

Let not the uninitiated reader fancy that Browne's loggerhead had been feasting on nymphs and the daughters of sea deities. The galateas* and medusas were simple acalephans or jelly-fishes—as they are most improperly called, for they have nothing of a true fish about them—and the like.

Hughes† is the last historian, to be here quoted, of those beautiful islands that rise from out the glowing sea, in all the prodigality of their tropical verdure,

As green as emerald,

once some of the brightest gems in the crown of Britain, now dimmed and poverty-stricken by a so-called liberal policy.

Of the three different sorts that frequent or are bred near these West Indian Islands, the hawk's-bill alone affords what is commonly call'd the tortoiseshell. The two other species (viz.), the green and the yellow, a mulatto tortoise,‡ have each of them such shells divided into as many regular laminae, but they are so very thin as not to be fit for use. A tortoise hath four fins, with which it paddles whilst in the water, not very different from the strokes of oars; and it is likewise by the help of these that the female glides along the sand when she comes on shore to lay her eggs. The common

* Galatea is, at present, the generic name of a crustacean.

† *A Natural History of Barbados.*

‡ The loggerhead, probably.

method of taking them is to pitch nets with very large meshes in the bays where they frequent, to feed upon the green and leaf'd moss that grows at different depths in the bottom of the sea. When taken entangled in these nets alive, they may be brought ashore and kept some weeks alive without any sustenance; for several days after they are taken they sigh heavily. If they die in the net, they stink in less than an hour's time; but if killed, which is done by cutting the throat (to give vent to the blood, which is always as cold as water), the flesh will keep, not only uncorrupted, but, though cut in pieces, the fore-quarter and callapee will continue to have a strong, lively, muscular motion, for fourteen or even eighteen hours: for if at that time it is pricked with a pin or fork, it will move and contract itself visibly. Some part of the flesh cuts reddish, resembling coarse beef; another part is white as a chicken; the fat about the fins is somewhat yellowish; but the far greater part close to the upper and under shell is as green as a leek. They are caught of different sizes; the largest that hath been taken in this island, within my remembrance, did not exceed four hundred weight. . . . The flesh when baked or stewed is a most delicious and nourishing diet; the young ones are often caught with a hook and line; the properest bait for this purpose is a sea-bladder; and they are likewise sometimes drawn ashore in nets. There is another method of taking the larger sort, especially the females, by watching their coming ashore in the night, upon the dry, sandy bays, in the months of June, July, August, and September, in which laying seasons, after they have crawled above high-water mark, they dig with their fins (which are strong, nervous, and fleshy) a hole of about two feet deep, in the loose sand, in which the female lays an hundred or more eggs; the outward tegument of these is rather skinny than shelly; its shape is round, of about an inch and a quarter diameter: the inside of the egg is yellow, and to the taste somewhat gritty. After these eggs are thus deposited in the sand, the tortoise fills up the hole in so nice a manner, that it will be scarce perceivable that the sand had been disturbed; and the eggs, by the heat of the sun, will, in nine weeks, be hatch'd, and the young tortoises immediately crawl into the sea.

The trunk turtle,* instead of being armed back and breast in plate armour, is sheathed, as it were, with buff stretched upon longitudinal rib-like processes, tuberculous

* *Sphargis coriacea*. *Testudo coriacea*, Linn.; Genus *Coriudo* of Fleming; *Dermatochelys* of De Blainville.

and serrated in young subjects, but completely smooth in the ancients. This is the *Testudo coriacea Mercurii* of Rondeletius; *Testudo lyra* of some German zoologists; *Tortue luth* of the French. These last names seem to claim for it a niche, as contributing to the construction of the ancient lyre; and, indeed, we see no reason for shutting out the thalassian tortoises from the competition. Hear Flaccus in his rapture:—

O testudinis aureæ
 Dulcem quæ strepitum, Pieri, temperas !
 O mutis quoque piscibus
 Donatura cycni, si libeat, sonum !
 Totum muneris hoc tui est,
 Quod monstror digito prætereuntium
 Romanæ fidicen lyre :
 Quod spiro et placeo (si placeo) tuum est.*

But those who point to the third of these grateful and gratifying lines, as evidence in favour of the sea-tortoises, must be reminded that the sphargis, as its name implies,† is so far from being mute, that it utters sounds very near akin to the bellowings of distress when entangled in the

* *Carm.* iv. 3. The lyre in the constellation *Lyra* on the Farnese globe surmounts the shell of a land-tortoise. The instrument has six strings only; one may have been defaced, or it may have been purposely omitted in memory of the lost Pleiad:—

Septena putaris
 Pleiadum numero fila dedisse lyre.

Certain wags of yore, by way of frightening the neighbours, used land-tortoises as the vehicles of lights of another description. Having fixed burning tapers on the backs of the tortoises, they turned them down in some cemetery, where the slowly wandering fires, now solitary, now meeting, as if two or more restless spirits were in conclave at the dead hour of night, produced the desired effect. Sometimes they would increase the panic, by adding to the tortoises a corps of able-bodied locustæ fitted out in the same manner; which formed an assemblage of corpse-candles and saltatory witch-fires sufficiently appalling.

† Σφαργέω, to utter a loud sound or roar.

fatal net, or oppressed with wounds. The carapace and plastron, with its longitudinal, string-like lines or ribs, may have suggested the lyrical name accorded to the species. We have said enough to put those hungry gentlemen on their guard who may feel disposed to consign it to the tureen. It attains a great size. Individuals weighing 700 and 800 pounds have been taken on our coasts. These were stragglers; but instances are on record of their having been captured, temptingly fat, of the weight of 1500 or 1600 pounds. Nor do some of the species of chelone stop at that point with which the lovers of turtle are familiar. Some of that genus have been taken with a carapace measuring nearly seven feet in length, and more than fifteen feet in circumference; and have turned the scale against from 800 to 900 pounds.

When first hatched, the shells of the young turtles are said to be comparatively imperfect, and the little animals have a blanched appearance. Their welcome upon emerging into the light, as they swarm out of the sand like ants from an ant-hill, is but a rough one; and few young animals are surrounded with more dangers. They instinctively make for the sea, but their numbers are greatly reduced by predatory birds and other enemies before it is reached; and there and then the hungry fishes wait for them open-mouthed. Still, as in the case of all other races, the issue of the battle of life is in their favour, till the species dies out, like the extinct *colossochelys* (Falconer), whose weight must have been something enormous; or like that chimera-like form of the ancient world, in which Nature seems freakishly to have united the sauro-chelysian, or half-lizard, half-tortoise shape, with the canines of a walrus.*

* *Dicynodon*. Discovered by A. G. Bain, Esq., in sandstone rocks at the south eastern extremity of Africa: named and described by Professor Owen in *Trans. Geol. Soc.* vol. vii. part 2.

The *testudinata* figure largely in the ancient pharmacopœia, and they seem to have a claim to the patronage of the deities of health equal, at least, to that of the serpents. They must, moreover, have been the terror of the Canidias of the time.

The flesh of land-tortoises serveth wel in perfumes and suffumigations, for so it is as good as a countercharm to put by and repell all sorceries and enchantments: a singular counterpoison also to resist any venome whatsoever. Great store of tortoises be found in Affricke: where they use to cut away the head and feet, and then employ the rest of the body as a soveraigne remedy against all poysons.

Tortoise pottage appears to have rivalled viper broth:—

If their flesh be eaten together with the broth wherein they are sodden, it is held to be very good for to discusse and scatter the wens called the King's Evil, and to dissipat or resolve the hardnesse of the swelled spleene: likewise to cure the falling sicknes, and to drive away the fits thereof. The bloud of tortoises clarifieth the eyesight and dispatcheth the cataracts, if they be anointed therewith. Many incorporat the said bloud in meale, and keep them reduced into the forme of pills; which when need requireth, they give in wine as a present help for the poyson of all serpents; spiders, and such like, yea and the venome of toads. The gall of tortoises mixt with Atticke hony, serveth to cure the fiery rednesse of the eyes, if they be anointed therewith: the same is good to be dropt into the wounds inflicted by the prick of scorpions. The ashes of the tortoise shel incorporat with wine and oile, and so wrought into a salve, heals the chaps and ulcers of the feet.

These are but a few of the miracles of healing effected by the application of this panacea of the Roman apothecary's shop.

Nor are the remedies incorporated in the turtles—the 'sea-tortoises'—a whit less powerful or numerous. We spare the catalogue of cures, which those who are curious may read in the marvellous pages of him who has been called the martyr of nature; only out of our benevolence, and by way of throwing those numerous specifics for the

toothache that adorn those towering nuisances, the advertising vans, into the shade, informing the afflicted that, 'Whosoever rubbeth their teeth with tortoise bloud, *and use so to do a whole yeare together*'—remember that—'shal be freed from the pain thereof for ever.'*

The ancient mariner—not Coleridge's—believed that the foot of a tortoise put on board would stop the way of the ship; and the housewife of other days had no doubt that the shell of a tortoise placed on the pot as it simmered over the fire would prevent it from boiling over.

The tortoise of ancient fable was sufficiently sage, except when he prevailed on the eagle to give him a lesson in flying, and suffered accordingly. To say nothing of his race with the hare, he was eminently reflective as well as persevering. And though he was tempted to murmur at first when he saw the lithe and leaping frogs clearing at a bound a space which cost him long and sore travel, as he dragged himself and his shell along upon the earth—when he saw the eel and King Stork at work upon them, and how their unarmed bodies exposed them to the stones thrown by a mere child, he repented and said,—'How much better to bear the weight of this shielding shell, than to be subject to so many forms of wounds and death.' And when he beheld Io dancing a frantic hornpipe to the tune of a gadfly, did he not hug himself, and glancing at his panoply, exclaim,—I don't care for flies?†

To be sure, he was at times more honest than polite; as when, on receiving Jove's command to meet the rest of animated nature on the occasion of his nuptials with Juno, he returned the somewhat ungracious answer,—*οἶκος φίλος, οἶκος ἄριστος*—'home, sweet home; there's no

* Holland's Pliny.

† Non curat testudo muscas.

place like home,'—a reply which so roused the ire of the father of gods and men, that the fiat went forth,—'As his home is so dear to him, he shall never go out of it.' This was rather shocking at first; but our philosophical tortoise bowed to the decree, observing, that he much preferred carrying his house about with him to being a fixture, where he might be condemned to disturbance by the quarrels of his neighbours.

But why did Apelles paint his image under the feet of Aphrodite? * Why did Phidias make the delicate foot of his chryselephantine statue rest upon this sedentary emblem? †

As a hint to ladies to be quiet, and stay at home—excellent things in woman.

Upon my word, sir!

The idea, madam, I assure you is not mine. You read Latin with the ease of a Roman matron. No? Then ask your husband, son, or brother, to do the following into English:—

Alma Venus quænam hæc facies, quid denotat illa
 Testudo molli quam pede, Diva, premis?
 Me sic effinxit Phidias, sexumque referri
 Fæmineum nostrâ jussit ab effigie.
 Quodque manere domi et tacitas decet esse puellas,
 Supposuit pedibus talia signa meis.

The women wore wooden images of the reptile to denote their silence and domesticity, as Laïs knew to her

* Tardigrada, herbigrada, domiporta et sanguine cassa,
 Sub pedibus Veneris Çous quam pinxit Apelles.

This must have been a different picture from that of the celebrated Venus Anadyomene by the same hand, which was, probably, in the splendid collection of Augustus before he transferred the masterpiece to the temple dedicated by him to Julius Cæsar. Ovid notices a painting which may well pass for it, in his description of the finest works in that magnificent palace.—*Trist.* ii. 527, 528.

† In the temple of Venus Urania.

cost, when the Thessalian matrons assassinated her with such ornaments. Over-zealous worshippers were they of the celestial Venus, the good, the retiring, the personification of all that is amiable, beautiful, and modest:

So stands the statue that enchants the world.

November,^{*} 1850.

CHAPTER XII.

FEW of those who stand near some quarry in our inland counties, surrounded by all the beauties of British scenery, hill and valley, down and field, luxuriant with woods, carpeted with herbage, or waving with corn, bestow a thought on the character of the rock beneath. It occurs not to many, that where the grass now grows and the cattle low the waves once flowed ; and that the ripple-mark may still be seen on what was once the ribbed sea sand.

To those who are unacquainted with geology, it is startling to be told that the solid slab of stone so marked, when last exposed thousands of years ago, was part of the sandy shore over which the animated beings, now blotted from the book of life, wended their way, leaving in many cases the traces of their steps, just before some great convulsion of our planet changed the whole appearance of the surface, but spared these unmistakeable records to tell the tale.

No one with any powers of generalization can long study the system of animated nature without being satisfied that he must search among the wrecks of bygone ages for those forms which are required to make it complete, and that in the fossil fauna he will find the lost links of the broken chain.

Among the ichnolites, or fossil foot-prints, which have attracted so much attention of late years, those announced by Dr. Ogier Ward, as proving the existence of a small four-footed animal at the period of the deposition of the new red sandstone near Shrewsbury, were brought under the notice of the British Association at Birmingham.

They most nearly resembled those figured in the paper on the new red sandstone of Warwickshire, by Sir Roderick Murchison and Mr. Strickland,* but differed in exhibiting more distinct indications of the terminal claws, and less distinctive impressions of the connecting web: the innermost toe was less, and there was an impression always at a distance from the fore-toes, like a hind-toe pointing backwards, the point of which only seemed to have touched the ground, reminding the observer of such an impression as might have been made by a wading bird, and of the 'ornithichnites' discovered by Dr. Hitchcock in the Connecticut new red sandstone, which have been referred to the grallatorial tribe of birds.

The American fossil footsteps were found at five places near the banks of the river, within a distance of thirty miles, at various depths beneath the surrounding surface, in quarries of laminated flag-stones. The inclination of the stone is from 5° to 30° ; and there is evidence to warrant the conclusion, that the tracks were impressed before the strata were so inclined. Many of these tracks, clearly showing that they belonged to different individuals and species, cross each other; and the footmarks are not unfrequently crowded together, reminding one of the impressions left by the feet of ducks, geese, and other birds, on the muddy shore of the stream or pond frequented by them. These foot-prints are referred by Professor Hitchcock to seven species at least, if not genera, of very long-legged wading birds, varying in size from that of a snipe to dimensions twice as great as those of an ostrich. The steps are seen in regular succession on a continuous track, as of an animal walking or running, the right and left foot always occupying their proper places. At Mount Thorn, near Northampton, were discovered four nearly parallel tracks of a gigantic animal,

whose foot was fifteen inches long, exclusive of the largest claw, which was two inches in length. The toes were broad and thick, and in one track appeared a regular succession of six of these steps, four feet distant from each other. The distance in other tracks varied from four to six feet. Another footmark extended to the length of from fifteen to sixteen inches, without reckoning a remarkable appendage extending backwards eight or nine inches from the heel. The impressions of this appendage present traces similar to what may be made by wiry feathers or coarse bristles; these last appear to have sunk into the ground nearly an inch. The toes had penetrated much deeper, and the mud or sand appeared to have been raised into a ridge rising several inches around their impressions, reminding the observer of the elevation round the track of an elephant over moist clay. Intervals of six feet were noted as the length of the stride of the impressor of this so called ornithichnite. The bones of fishes only (*Palæothrissum*) had been discovered in this impressed rock.

If Professor Hitchcock be right in his conclusion, that these enormous foot-prints are the vestiges of feathered giants, there can be no doubt that they justify the remark that they are of the highest interest to the palæontologist, as they establish the new fact of the existence of birds at the early epoch of the new red sandstone formation; and further show that some of the most ancient forms of that class attained a size far exceeding that of the largest among the feathered inhabitants of the present world.

The discovery of the bones of the gigantic *Dinornis* (Owen), have proved beyond all question the last conclusion: but the student will do well, before he accepts the former, to investigate thoroughly Professor Owen's papers on *Labyrinthodon*,* remembering that the toes

* *Geol. Trans.* Second Series.

of Dr. Hitchcock's giant were broad and thick. The foot-marks of that gigantic batrachian (*Salamandroïdes*, Jäger—*Mastodonsaurus* and *Phytosaurus*, of the same—*Chirotherium*, Kaup) were impressed on a shore; and in some of the specimens of that petrified strand were the impressions of drops of rain that had fallen upon the strata while in the process of formation. On the surface of one at Storeton, where the impressions of the foot-marks were large, the depth of the holes made by the rain-drops on different parts of the same footstep varied with the unequal pressure on the clay and sand, according to the salient cushions and retiring hollows of the animal's foot. The constancy of these appearances upon an entire series of foot-prints in a long and continued track, showed that the rain had fallen after the creature had passed.

The equable size of the casts of large drops that cover the entire surface of the slab (says Dr. Buckland, in his Address to the Geological Society of London on this phenomenon), except in the parts impressed by the cushions of the feet, records the falling of a shower of heavy drops on the day in which this huge animal had marched along the antient strand: hemispherical impressions of small drops upon another stratum, show it to have been exposed to only a sprinkling of gentle rain that fell at a moment of calm. In one small slab of new red sandstone, found by Dr. Ward near Shrewsbury [where the remains which will presently be alluded to were found], we have a combination of proofs as to meteoric, hydrostatic, and locomotive phenomena, which occurred at a time incalculably remote, in the atmosphere, the water, and the quarter towards which the animals were passing; the latter is indicated by the direction of the footsteps which form their tracks: the size and curvatures of the ripple-marks on the sand, now converted to sandstone, show the depth and direction of the current: the oblique impressions of the rain-drops register the point from which the wind was blowing at or about the time when the animals were passing.

But how was this record so firmly imprinted on the stone? The answer is ready from the same eloquent and accurate oracle:—

The clay impressed with these prints of rain-drops acted as a mould, which transferred the form of every drop to the lower surface of the next bed of sand deposited upon it, so that entire surfaces of several strata in the same quarry are respectively covered with moulds and casts of drops of rain that fell whilst the strata were in process of formation.*

No, you are not about to be dragged into a treatise on ichnology, friendly reader; though, believe me, you will find the subject, pregnant as it is with evidences of uncouth extinct forms that have passed away from life for ever, wending their way over the shores of a half-formed world, amid wind and rain, storm and sunshine, as marvellous, ay, and as entertaining too, as a fairy tale. You are only to be led to the contemplation of the ichnolites from the Shrewsbury sandstone, as a fit introduction to the crocodiles, which will next claim your attention.

Professor Hitchcock, as we have seen, undoubtedly claims his ichnolites as due to the presence of birds on the spot where they were impressed; but, as Professor Owen well observes, any evidence of a warm-blooded and quick-breathing class of animals at so remote a period as the new red sandstone epoch, requires to be very closely sifted; and, accordingly, the chance of obtaining any analogical facts, bearing upon Professor Hitchcock's ornithichnites, induced our Professor to spare no exertions to obtain further insight into the problematical creature of the Grinsill quarries.

Dr. Ward kept a sharp eye upon the quarrying operations; and soon, in addition to the footsteps, fossils were from time to time found, secured, and liberally sent up to the Professor, who was thus enabled to form a clear opinion of the animal that had impressed the sands with its feet. The result was the Professor's *Description of an Extinct Lacertian Reptile, Rhynchosaurus articeps*

* Address delivered to the Geological Society of London on the 21st February, 1840, by the Rev. W. Buckland, D.D. President.

(Owen), of which the bones and foot-prints characterize the Upper New Red Sandstone at Grinsill, near Shrewsbury, published in the seventh volume of *The Transactions of the Cambridge Philosophical Society*. For the highly interesting details of this masterly paper we must refer the reader to the memoir itself, which will well repay an attentive perusal; suffice it to say, that this Rhynchosaur turned out to be neither crocodilian, batrachian, nor chelonian, though in a degree allied to each of those tribes, and that the fortunate preservation of the skull brought to light modifications of the lacertine structure leading towards the tortoises and birds, which were before unknown.

Before we sketch the natural history of the crocodiles, it may not be unamusing to pass rapidly in review some of the legends with which the ancients connected a form selected by the Egyptians as the symbol of a cruel and revengeful being. The horrible shape and detestable disposition of the crocodile, made it an apt representative of the murderer of Osiris;* and when it was regarded as the personification of Typhon, it must be confessed that it looked the character of that evil one well, as any one will allow who looks on the devilish woodcut that surmounts the old French quatrain:—

Le Nil produit des monstres perilleux
Lors que d’Egypte arrouse le pais.
Mais entre ceux, dont sommes esbahiz,
Le crocodile est le plus merveilleux.

The sculptor has done his best to make the monster look decent as he appears on the robe of the Nile in the celebrated statue; but one of the surrounding sixteen

* Osiris, the popular divinity, the ruler of the Nile, the benign dispenser of plenty, had for his antagonist and destroyer Typhon, the scorching desert wind, that dried up the fructifying waters, bearing famine and death on its wings, when it unseasonably prevailed.

typical children finds himself rather inconveniently near the open mouth of the destroyer, and is represented as starting back accordingly; while another lends him a hand to help him out of the dangerous neighbourhood. Poor old Nilus! he must have had warm work to keep his crocodiles in anything like order when the terror-stricken son of Clymene was hurried by his father's runaway horses he knew not where, and the quiet, steady Moon beheld with amazement her brother's chariot dashing along beneath her own. The crocodilian commotion under that smoking state of things must have been the cause of his extremity of horror, for the Tanais, the Caïcus, the Lycormas, the Xanthus, the Mæander, the Euphrates, the Ganges, the Danube, the Ismenus, the Phasis, the Tagus, the Caïster, whose swans then sung their last and died; the Rhine, the Rhone, the Tiber,—all suffered equally, and stood their ground; but

Nilus in extremum fugit perterritus orbem
Occulitque caput, quod adhuc latet.

Father Thames was happily out of the way, or not sufficiently known to the polite world on that occasion. His turn, however, is at hand. A foreign prince and priest, shot from his proper sphere, is coming down upon him: but we will venture to prophesy that he will not run away like the affrighted Nile, but continue to go between his banks, and look the Archbishop of Westminster boldly in the face.

As the serpents had their *Psylli*, so the crocodiles had their *Tentyritæ* :—

Moreover, there is a kind of people that cary a deadly hatred to the crocodile, and they be called Tentyrites, of a certain isle even within Nilus, which they inhabite. The men are but small of stature, but in this quarrell against the crocodiles they have hearts of lions, and it is wondrous to see how resolute and courageous they are in this behalfe. Indeed this crocodile is a terrible beast to them that fie from him: but, contrary, let men pursue him or make head againe, he runnes away most cowardly. Now, these

islanders be the only men that dare encountre him in front. Over and besides, they will take the river, and swim after them; nay, they will mount upon their backs, and set them like horsemen: and as they turn their heads, with their mouths wide open to bite or devour them, they will thrust a club or great cudgell into it crosse overthwart, and so holding hard with both hands each end thereof, the one with the right, and the other with the left, and ruling them perforce (as it were) with a bit and bridle, bring them to land, like prisoners; when they have them there, they will so fright them only with their words and speech, that they compel them to cast up and vomit those bodies againe to be entered, which they had swallowed but newly before. And therefore it is, that this is the only isle which the crocodiles will not swim to: for the very smell and sent of these Tentyrites is able to drive them away, like as the Pselli, with their savour, put serpents to flight. By report this beast seeth but badly in the water: but be they once without, they are most quick-sighted. All the four winter months they live in a cave and eat nothing at all. Some are of opinion that this creature alone groweth all his life: and surely a great time he liveth.*

To say nothing of more ordinary methods of capture, if a crocodile was only touched with the feather of an ibis it instantly became motionless; and there was another mode, if old chroniclers are to be believed, not unworthy of note. It was thought a bitter and bright, as well as a novel idea, when some ill-conditioned scapegrace sent a looking-glass to an importunate Gorgon, who was qualified for admission into the Ugly Club—if any woman ever was ugly, which we with all gallantry and humility doubt—in the hope that the first look at herself would be fatal. But here, again, we have the old adage, *Pereant qui ante nos, &c.*—‘There is nothing new,’ &c., forced upon us. The sure way to settle a crocodile, according to ancient practice, was to confront him with a mirror, when he incontinently died of fright at his own deformity.

Crocodile tears’ have become a proverb somewhat

* Pliny.

musty; and yet everybody may not know that there was another version besides the vulgar one, of working upon the kind-hearted traveller by apparent distress, getting him within reach, and then destroying him. It was held for certain that when a crocodile had got hold of a man and killed him, it consumed its prey comfortably enough till it came to the head, which would have proved too hard a nut for our crocodile to crack, without pouring forth a copious shower of tears as a solvent, which softened the skull, and put the ravenous reptile in easy possession of its tit-bit—the brain.

One of their horrible functions, among the Indians, was to act as the finishers of the law in capital cases, as elephants were employed by Asiatic autocrats not very many years since,* but in a different manner, as may be well supposed. The crocodile-executioners were kept without food when judgment of death was anticipated; and the condemned wretch was dragged to the tank, where the hungry monsters glared at him with their green cannibal eyes, as the assistants deliberately bound him hand and foot, and then tossed him alive to the chasms of their gaping, serrated, clanking jaws. They

* Mr. Sirr, in his entertaining book, *Ceylon and the Cingalese* (8vo. London, 1850, Shoberl), mentions a striking instance of the docility of one of these elephants.

During the reign of the last blood-stained king of Kandy, the terrible custom which had long prevailed of execution by elephants, who were trained to prolong the suffering of the doomed criminal by crushing the limbs before the *coup-de-grace* was given, prevailed.

One of the elephant-executioners was at that place during Mr. Sirr's sojourn there, and he was desirous of testing the sagacity and memory of the brute. It was of huge size, and mottled, and stood quietly with the keeper seated on its neck. The noble, who accompanied Mr. Sirr and his party, desired the man to dismount and stand on one side.

The chief gave the word of command,—‘Slay the wretch!’

The elephant raised his trunk, and twined it as if grasping a

were also retained as guards in Pegu; the ditches of the fortifications being filled with them.

The *Quæstiones crocodilinae*, those *plicæ et serræ dialecticorum*, as they have been called, took their rise from certain stories in which the crocodile figures. For instance, a woman was taking a walk with her little son on the banks of the Nile; a lurking crocodile carried him off, saying, he should be restored if his mother responded truly.

‘Do I mean to give him up?’ asked the crocodile.

‘No, you don’t,’ answered the mother; ‘and, therefore, according to your rule, you ought.’

Whether the mother ever got her son back must be left to the judgment of those who have been made to feel how many points of the law are centered in possession, especially where crocodiles are concerned.

The same story is the foundation of the crocodiline question put in Lucian’s dialogue:—

‘Have you a son?’

‘What then?’

‘If he was wandering near a river and a crocodile should find him and carry him off, but should promise to restore him upon your giving a true answer to the

human being, and then made motions as if he were depositing the patient on the earth before him, then slowly raised his forefoot, and placed it alternately upon the spots where the limbs of the sufferer would have been. This he continued to do for some minutes; and then, as if satisfied that the bones must be crushed, raised his trunk high above his head and stood motionless.

The chief now said,—‘Complete your work.’

The elephant immediately placed one foot on the place where the victim’s abdomen would have been, and the other upon the spot where the head must have rested, appearing to exert his whole strength to crush the victim, and trample out the remains of life.

The tyrant was dethroned in 1815; and since that time the animal had never been called upon to execute his horrible office.

question, whether it was intended to do so or no, what would you say were the crocodile's intentions?'

'You ask me a perplexing question, truly.'

But almost everything has its bright side, and so has a crocodile. Did not one save good King Minas when he tumbled into the water? And were they not reckoned admirable safeguards for preventing robbers from crossing the river? In short, they made a very respectable figure among the mob of animal and vegetable Egyptian deities, and were treated accordingly, as we shall presently see. Silence is not only the gift, but the attribute of the gods, and as the ancients believed that a crocodile had no tongue he had a pretty safe claim, which, joined to his alleged fore-knowledge of the extent of the inundation of the Nile, was all-sufficient for his deification. Hence, no doubt existed of the salvation of the man devoured by one of these reptiles. The sure road to heaven went through a crocodile's maw;* and even those who were bitten by one were considered peculiarly fortunate. The priests were not slow in availing themselves of these articles of belief, which they themselves had invented, and accordingly they took care to have tame crocodiles ready to receive the offerings of the faithful. Strabo saw one of these at Arsinoe, that 'city of the crocodiles,' and an apolaustic life he seems to have led. Bread, meat, and wine, the contributions of travellers and pious neighbours, formed his ordinary diet. Strabo's host—a man of consequence, and the guide of the party in everything relating to sacred things—led the way to the pond, carrying from the table a small cake, some roasted meat, and a cup of spiced wine well mulled. They found Suchos, in which name the croco-

* If a person was killed by a crocodile, or drowned in the Nile, his body was embalmed by the priests, and deposited in the sacred tombs.

dile rejoiced, stretched at his ease on the margin. Straightway did the priests approach him. Some opened his mouth, one acolyte popped in the cake, another crammed down the meat, and the whole was finished by pouring down the wine; when Suchos plunged into the pond and swam over to the other side to take his *siesta*. If many pilgrims visited his shrine with similar offerings in the course of a day, the deity must have occasionally afforded the awful spectacle of 'a drunken monster,' second only to that of Lablache's Caliban.

What a wondrous piece of acting that is! The brutal passion—the cunning ignorance—the monster lower than the man but higher than the brute—something between a chimpanzee and humanity, with a strong dash of his devilish dam in him, are brought out as no actor but that great artist could portray them; and when the mass warms up under the influence of Trinculo's bottle—but words cannot convey the personification: go and see him. Why will not some gifted master write a Sicilian opera, if *Acis and Galatea* will not suffice, and present Lablache as Polyphemus? All Europe would crowd to behold the incarnation of the Cyclops.

But my pen is running away with me as usual, and must be brought back to these well-fed and well-appointed crocodiles, which were looked up to with some faith as oracles of divination. If the crocodile spontaneously took the cake, or other food offered, it was a good omen: but if the offering was unheeded or rejected, the worst might be expected. There was a dark story that the priests concluded, from such a rejection, that Ptolemy's death was near.

Geoffroy seemed to think that the *Suchos* was a mild and inoffensive species, whose more gentle nature led the Egyptians to deify and tame it; but, to say nothing of the fugitive characters relied on by him as constituting specific difference—characters which can hardly be viewed

as indicating more than variety—it seems that the three crocodile mummies, so far from being specimens of Geoffroy's *Suchos*, are identical with his *marginatus*, *lacunosus*, and *complanatus*.* *Souc*, or *Souchis*, according to M. Champollion, indicates the Egyptian name of *Saturn*; and *Suchos* was, in all probability, the proper name of the individual that Strabo saw at Arsinoe. Thus Apis was the sacred bull of Memphis; that of Heliopolis was Mnevis.

But, however this may be, there can be no doubt that the animal was tamed by the ancients; and as little that proper treatment meets with the same success now. Plutarch relates how the crocodile can be made obedient to the human voice and hand, opening its mouth and suffering its teeth to be cleaned with a towel.

Crocodiles, says Herodotus,† are sacred with some of the Egyptians; but not so with others, who treat them as enemies. Those who dwell about Thebes and the lake Moeris look on them as very sacred; and they each train up a crocodile, which is rendered quite tame. Into the ears of these crocodiles they put crystal and gold ear-rings, and adorn their fore-paws with bracelets. They give them appointed and sacred food, treating them as well as possible while alive, and when dead they embalm and bury them in the sacred vaults. But the people who dwell about the city Elephantine eat them, not considering them sacred. They are not called crocodiles by the Egyptians, but *champsæ*. The name of crocodiles was given to them by the Ionians, because they thought they resembled lizards,‡ which are found in the hedges

* Geoffroy founded his *C. complanatus* on mummies, which MM. Duméril and Bibron assert are clearly specimens of *Crocodilus vulgaris*.

† *Eut.* 69.

‡ Κροκόδελαι. In Kircher's *Egyptian Dictionary*, *Pi-souchi* is made—but upon no sound foundation—the Coptic name for a

in their country. But as the crocodile, in a state of nature, was not very likely to find any careful attendant ready to rub his teeth with a napkin, Nature, it seems, has sent him an animated feathered toothpick.

The following, says the Halicarnassian, is the nature of the crocodile:—During the four coldest months it does not eat: though it has four feet, it is amphibious. It lays its eggs on land, and hatches them there. The greater part of the day is spent on the dry ground, but the whole night in the river, for in the night-time the water is warmer than the air and the dew. Of all living things of which we know, this grows to be the longest from the smallest beginning. It lays eggs little larger than those of a goose, and the young at first is suitable in size to the egg; but when grown, it reaches to the length of seventeen cubits and more. It has the eyes of a pig, and the teeth and projecting tusks are large in proportion to the body. It is the only animal that has no tongue: it does not move the lower jaw, but is the only animal that brings down its upper jaw to the under one. It is furnished with strong claws, and a skin covered with scales not to be broken on the back.*

With the exception of the very pardonable mistake generally current with the ancients, in consequence of their being deceived by appearances, about the absence of the tongue and the want of motion in the lower jaw, the description above given may pass very creditably; but then comes a statement, for which we have heard Herodotus branded as a most daring fabulist.

It is blind in the water, continues the historian, but

crocodile. *Emsah*, or *hamsa*, is stated by the safest authorities to be the Coptic word from which, with the feminine article prefixed, has come the Arabic word *timsah*, now current on the banks of the Nile. Herodotus, who was evidently aware of this name, gives it under the form of *χαμψα* (*champsä*).

* *Eut.* 68.

very quick-sighted on land ; and because it lives for the most part in the water its mouth is filled with leeches. All other birds and beasts avoid him, but he is at peace with the trochilus, because he receives benefit from that bird. For when the crocodile gets out of the water on land and then opens its jaws, which it does most commonly towards the west, the trochilus enters its mouth and swallows the leeches : the crocodile is so well pleased with this service that it never hurts the trochilus.*

Upon this foundation succeeding writers have raised their fantastic structures, and we proceed to give one or two modes of telling the same story :—

All the day time the crocodile keepeth upon the land, but he passeth the night in the water : and in good regard of the season he doth the one and the other. When he hath filled his belly with fishes, he lieth to sleep upon the sands in the shore : and for that he is a great and greedie devourer, somewhat of the meat sticketh evermore between his teeth. In regard whereof cometh the wren, a little bird called there trochilos, and the king of birds in Italy : and shee for her victual's sake, hoppeth first about his mouth, falleth to pecking or picking it with her little neb or bill, and so forward to the teeth, which she cleanseth, and all to make him gap. Then getteth shee within his mouth, which he openeth the wider, by reason that he taketh so great delight in this her scraping and scouring of his teeth and chaws. Now when he is lulled as it were fast asleep with this pleasure and contentment of his : the rat of India, or ichneumon, spieth his vantage, and seeing him lye thus abroad gaping, whippeth into his mouth, and shooteth himselfe downe his throat as quicke as an arrow, and then gnaweth his bowels, eateth a hole through his belly, and so killeth him.†

Scaliger, somewhat scandalized that Pliny had made the bird a wren, was of opinion that it should be described ; and the trochilus then came out of the size of a thrush, with an acute crested feather, which it had the power of erecting, so as to prick the palate of the crocodile if he should close his jaws and shut her in. Aldrovand backs this doctrine by a reference to Leo's work on

* *Ibid.* Cary.

† Holland's Pliny.

Africa, who declares that he saw on the banks of islands in the middle of the Nile crocodiles sunning themselves, and birds, about the size of a thrush, flitting about them; but after a short space the birds flew away. His inquiries were answered by a statement, that portions of the fishes and other animals on which the crocodile feeds stick about his teeth and breed worms, to his great torment. The birds, perceiving the worms when the crocodile gapes, come to feed upon them. But the crocodile, as soon as he finds that all the worms are eaten up, closes his mouth, and attempts to swallow the bird that has entered, but, being wounded by the sharp spine with which the head of the bird is armed, gapes again and sets the winged prisoner free.

The narrative of Herodotus has received corroboration from the pen of the accomplished author of *Visits to Monasteries in the Levant*.*

I will relate (says Mr. Curzon, in that amusing and interesting book) a fact in natural history which I was fortunate enough to witness, and which, although it is mentioned so long ago as the times of Herodotus, has not, I believe, been often observed since; indeed, I have never met with any traveller who has himself seen such an occurrence.

I had always a strong predilection for crocodile-shooting, and had destroyed several of these dragons of the waters. On one occasion I saw a long way off a large one, twelve or fifteen feet long, lying asleep under a perpendicular bank, about ten feet high, on the margin of the river. I stopped the boat at some distance; and noting the place as well as I could, I took a circuit round, and came down cautiously to the top of the bank, whence with a heavy rifle I made sure of my ugly game. I had already cut off his head in my imagination, and was considering whether it should be stuffed with its mouth open or shut. I peeped over the bank: there he was within ten feet of the sight of the rifle. I was on the point of firing at his eye, when I observed that he was attended by a bird called a zic-zac. It is of the plover species, of a greyish colour, and as large as a small pigeon.

The bird was walking up and down close to the crocodile's nose.

* London: John Murray. 1849.

I suppose I moved, for suddenly it saw me, and instead of flying away as any respectable bird would have done, he jumped up about a foot from the ground, screamed 'Zic-zac! zic-zac!' with all the powers of his voice, and dashed himself against the crocodile's face two or three times. The great beast started up, and immediately spying his danger, made a jump into the air, and, dashing into the water with a splash which covered me with mud, he dived into the river and disappeared. The zic-zac, to my increased admiration—proud, apparently, of having saved his friend—remained walking up and down, uttering his cry, as I thought, with an exulting voice, and standing every now and then on the tips of his toes in a conceited manner, which made me justly angry with his impertinence. After having waited in vain for some time, to see whether the crocodile would come out again, I got up from the bank where I was lying, threw a clod of earth at the zic-zac, and came back to the boat, feeling some consolation for the loss of my game in having witnessed a circumstance, the truth of which has been disputed by several writers on natural history.

The crocodile's protector was actuated, doubtless, by that self-interest which governs so many social compacts; and Herodotus, when he describes the bird as freeing the crocodile from his troublesome parasites, only records an alliance which is far from uncommon in the history of animals. To say nothing of the familiar instances of the daws, magpies, and starlings, that attend upon our sheep and horned cattle, there are more close alliances founded on a reciprocity of benefits. Such, among the warm-blooded vertebrated animals, is the connexion between the *Buphaga erythrohyncha*—the *beef-eater* of the English, the *pique-bœuf* of the French,—and the oxen, camels, and antelopes, which it frees from the *larvæ* that burrow in their hides, for which service its feet and beak are admirably adapted;—the feet, armed with strong claws, affording a firm hold on the back of the animal, and the beak, fashioned so as to dig and extract the maggots as neatly as an instrument, combining the qualities of a lancet and forceps, in skilful surgical hands, could perform the operation. Such are the rhinoceros birds mentioned by Mr. Cumming.

Even among the molluscous animals we have the association of the pinna and the crab.

The rhinoceros birds were just as attentive to their charge as the guard which deprived Mr. Curzon of his 'ugly game.' A native had informed Mr. Cumming that a white rhinoceros was lying asleep in thick cover, and he accompanied his guide to the spot. The rhinoceros was lying asleep beneath a shady tree, and his appearance reminded Mr. Cumming of an enormous hog. The beast kept constantly flapping his ears, which, he says, rhinoceroses invariably do when sleeping. But before he could reach the proper distance to fire, several *rhinoceros birds* by which he was attended warned him of his impending danger, by sticking their bills into his ear, and uttering their harsh grating cry. Thus aroused, he suddenly sprang to his feet, crashed away through the jungle at a rapid rate, and Mr. Cumming saw him no more.

But it appears that it is not to the rhinoceros alone that these guardians do good service.

These rhinoceros-birds (continues our mighty hunter) are constant attendants upon the hippopotamus and the four varieties of rhinoceros, their object being to feed upon the ticks and other parasitic insects that swarm upon these animals. They are of a greyish colour, and are nearly as large as a common thrush; their voice is very similar to that of the mistletoe-thrush. Many a time have these ever-watchful birds disappointed me in my stalk, and tempted me to invoke an anathema on their devoted heads. They are the best friends the rhinoceros has, and rarely fail to awaken him, even in his soundest nap. 'Chuckuroo' perfectly understands their warning, and, springing to his feet, he generally looks about him in every direction, after which he invariably makes off. I have often hunted a rhinoceros on horseback, which led me a chase of many miles, and required a number of shots before he fell, during which chase several of these birds remained by the rhinoceros to the last. They reminded me of mariners on the deck of some bark sailing on the ocean, for they perched along his back and sides; and as each of my bullets told on the shoulder of the rhinoceros they ascended about six feet into the air, uttering their harsh cry of alarm, and then resumed their position. It sometimes happened that the lower branches of trees, under which the rhinoceros passed, swept them from their living deck, but they

always recovered their former station; they also adhere to the rhinoceros during the night. I have often shot these animals at midnight when drinking at the fountains, and the birds, imagining they were asleep, remained with them till morning, and on my approaching, before taking flight, they exerted themselves to their utmost to awaken Chuckuroo from his deep sleep.

Geoffroy was of opinion, and others agree with him, that the Egyptian dotterell,* first described by Hasselquist, is the *trochilos* of Herodotus; and it is a curious instance of the perverseness of systematists, that they should have pressed the last-mentioned name into their service to designate those volatile animated gems † which shoot by like meteors in that western world which was

* *Charadrius Ægyptius*, Linn. Hamet, Hippo's careful and intelligent attendant, when told what Herodotus and Aristotle had stated on this subject, expressed his disbelief of the story, but said he knew the bird, which he described pretty accurately. Mr. Mitchell took him down to the museum in the garden, when he at once pointed out *Hoplopterus spinosus*, a spur-winged dotterell or plover, as the bird he meant. This species, it appears, is constantly found in the places where the crocodiles land, and runs about hunting for insects—small mollusca, perhaps, and such things—when the crocodiles are lying asleep. The appearance of the hunter immediately excites a noisy note from the plover, the crocodile wakes, and the natives believe that the bird is the crocodile's friend and watchman. The Sheigea Arabs call this bird *El sugda*: the natives of Dongola call it *EPum tisaad*, which, being interpreted, means the cousin or niece of the crocodile. Mr. Curzon's narrative leads to the inference of a much more intimate connexion • between the bird and the crocodile than a mere cry at the approach of danger. The spur on each of the wings of *hoplopterus* is nearly half an inch long. The reader will remember, in one of the versions of the story, the sharp spine with which the bird is said to be armed, and which Leo places on its head.

† The humming-birds—*Trochilidæ* and *Trochilus* of modern ornithologists—inhabiting America and the West India Islands. Mr. Gould, with a part of whose brilliant collection the public is already familiar, from the exhibition in the Zoological Society's Garden in the Regent's Park, is now surpassing his other grand zoological works, by the publication of the family of these 'gay creatures of the element.'

unknown to the ancients, and to which these brilliant birds are exclusively confined. Linnæus, who gives the Egyptian dotterell a place among his *charadrii* (plovers), makes no sign as to its being the *trochilus* of Herodotus, and he adopts that word as the specific name of the common wren of our hedges.*

In the grand battle between the hippopotami and the crocodiles, represented on the plinth of the statue of Nilus, a somewhat long-billed but rather corpulent long-legged bird seems ready to come to the assistance of a crocodile, which has a hippopotamus fast by the nose. Another and similar bird stands calmly before an open-mouthed crocodile. If the sculptor intended these for *trochili*, they have not much of the wren about them, nor of the plover either. They may have been meant for ibises looking on at the row.

Hasselquist declares that the crocodiles do inexpressible mischief to the common people of Upper Egypt, often killing and devouring women who come to the river to fetch water, and children playing on the shore or swimming in the river. He relates that in the stomach of one dissected before Mr. Barton, the English consul, the bones of the legs and arms of a woman, with the rings which Egyptian women wear as ornaments, were found. The fishermen, whose nets are broken by the crocodiles if they come in his way, are, he says, often exposed to great danger from those terrible monsters.

Sonnini relates that they are formidable to the inhabitants, and that in some places the natives are obliged to form in the river an enclosure of stakes and faggots, that the women, in drawing water, may not have their legs carried off by the crocodiles. The Catholics, he adds, are persuaded that those hideous destroyers will attack a Mussulman, but forbear to injure a Christian, and bathe without fear in the Nile, while the Mahome-

* *Motacilla trochilus.*

tans, acknowledging the miracle, dare not expose themselves there.

After alluding to the veneration which the crocodile experienced in some parts of Egypt in remote times, and the fury with which it was pursued and destroyed in others, Sonnini remarks that in his time the crocodile was neither revered nor destroyed. Banished to the most southern part of Egypt, they assemble there, he says, in vast numbers. They are to be seen when the sun is at its height, their heads above the water, immovable, and appearing at a distance like large pieces of floating wood, gliding slowly down with the current and basking in the heat, in which they delight. He shot several, approaching very close, which, as they were not often disturbed, he was able to do; but he does not appear to have bagged any like Mr. Cumming, with whose best and worst dog the crocodiles of South Africa made off. In the neighbourhood of Thebes, the small boat in which Sonnini sailed up the river was often surrounded by crocodiles. They saw the party pass with indifference, neither discovering fear nor any cruel intent at the approach of the voyagers. The noise of the musket-shot alone disturbed their tranquillity. Sonnini asserts that they never rise upon vessels, and that how little soever the gunwales may be raised above the water, nothing is to be apprehended from their attacks. But he advises the navigator to avoid thrusting his arms or legs into the stream, or he will run the risk of getting them snapped off by the sharp-pointed teeth of the crocodiles. Very alert in the water, which, he says, they cleave with rapidity, they make, according to him, but slow progress on dry land; and were it not that their colour and the coat of mud with which they cover themselves in walking along the miry shores of the Nile, disguise them so as to render them less perceptible, and thus expose men to be surprised by them, they are, he declares, by no means so dangerous out of the watery

element, in which they are stronger and more at liberty.

The portrait of the ichneumon, '*que les Egyptiens nomment Rat de Pharaon,*' is given in the *Portraits d'Animaux*,* with the following morsel of poesy:—

Voy le portrait du Rat de Pharaon,
Qui chasse aux rats, comme fait la Belette :
Au demeurant fort cauteleuse beste,
Qui autrement est nommée Ichneumon.

But not a word is said about the romance of its leaping into the gaping mouths of crocodiles, gliding into their bellies, and eating its way out of the entrails of the reptiles, which the ancient authors and many of the moderns loved to dwell upon, but which Sonnini treats with the contempt that it deserves. The natural food of the ichneumons consists of rats, birds, eggs, and reptiles; and if some of them have been seen springing on little crocodiles with fury when presented to them, the act was the effect of their general appetite for such game generally, and not of a particular antipathy. It would, as Sonnini observes, be at least equally reasonable to say that their mission on earth was to prevent the too great propagation of chickens, to which they are far more hostile than to crocodiles. In his time, and in more than half of northern Egypt, that is to say, in that part comprised between the Mediterranean Sea and the city of Siout, ichneumons were very common, although there were no crocodiles there; while they were more rare in Upper Egypt, where the crocodiles were more numerous. The great scourge of the crocodiles is a tortoise called *thirsé* by the Arabians—one of the Potamians probably—which, when the little crocodiles just hatched repair to the river, springs upon them and devours them. Persons of undoubted veracity at Thebaïs told Sonnini that out of fifty young crocodiles, the produce of one hatching,

* 1657.

seven only had escaped the thirsé, which is also a keen devourer of the crocodile's eggs. Seven little crocodiles, each eleven inches long, were brought to the French traveller when he was at Kous. Their teeth were already very sharp, and they appeared to have come into the world with the true crocodile spirit. The Egyptian who took them said that there were about fifty of them together, but that it was impossible to catch them all because the mother arrived unexpectedly, and was eager to fly at him. From such small beginnings are these enormous monsters developed. Sonnini saw at Negaudé the skin of a crocodile thirty feet long and four broad; and he was assured that some had been found in the Nile of the length of fifty feet. One thing is certain, that the number of teeth was as great in the newly-hatched reptiles as in those that had attained to that enormous size.

Herodotus* gives an amusing account of the bait with which the ancient fishermen bobbed for crocodile. Having well covered his hook with the chine of a hog, he makes, according to the historian, a cast into the middle of the river; and then, producing a young live pig on the bank, he beats it till he makes it squeal. The crocodile, attracted by the piercing cry, goes in the direction whence it proceeds, meets with the baited hook, swallows it, is struck, in angling phrase, and the tackle being none of the finest, is drawn bodily to land. But when the crocodile is there the angler would have but a hard time of it, if he did not instantly set to work to plaster up the eyes of his game with mud. When he has done this, it is managed very easily; but he has a world of trouble before the operation is completed. Hasselquist found a fishing-hook in the palate of one which he dissected; and the eggs which he procured, larger than that of a hen but less than that of a goose, covered with a hard

* *Eut.* 70.

crust, of a rugged surface, and of a cloudy white colour, were taken out of a female thirty feet long.

It was to be expected that the Roman populace, whose cry for novelty at the great shows only equalled that for bread, would be familiarized with the monsters of the Nile:—

Marcus Scaurus was the first man who, in his plaies and games that he set out in his ædileship, made a show of one water-horse and four crocodiles, swimming in a poole or mote made for the time during these solemnities.*

This seems to have been a zoological exhibition, and nothing more; but the crocodiles were soon brought forward for more cruel purposes, and to pander to the popular lust for blood. Augustus turned six-and-thirty into the amphitheatre at once. The shout raised by the thousands who beheld that monstrous entrance, could only have been equalled by the breathless silence with which they saw the bold, calm gladiators advance upon their frightful antagonists. The *bestiarii*, who were sworn to face any living thing that their lord and master chose to oppose to them, did their butcherly duty that day, for not one of the thirty-six was left alive.

Most probably the conquerors feasted on them afterwards, for there was a saying that

A crocodile is good meat,
All save the head and feet;

though a little musky, perhaps; and the head was not without its use in the Roman pharmacopœia, as, for instance:—

The eie-teeth of the said crocodile, filled up with frankincense (for hollow they be), and tied to any part of the body, put by those periodicall fevers which use to return at sett and certaine hours; but then the patient must not for five dayes together see the party who fastened the same about him. And they report likewise, that the little gravel stones taken out of their belly be of

* Holland's Pliny.

the same vertue to drive away the shaking fits of agues when they are comming, which is the cause that the Egyptians use ordinarily to anoint their sicke folk with the fat of this beast.

The blood, administered to the eyes, was supposed to promote clearness of vision. The fat bore a high price, for he who was anointed with it might fearlessly dive in the Nile, though surrounded by crocodiles. It was reckoned excellent good for the bites of serpents, according to Dioscorides; and Leo lauds its efficacy in the case of old ulcers, and even of cancers. Boiled in water with vinegar, it was held a sovereign remedy for the toothache, if the patient washed his face with the decoction; and no doubt it did the sufferers as much good as any nostrum now advertised. The skin, if carried round fields or gardens, and afterwards suspended there, was held to be a sure defence against approaching hailstorms. In modern times, not only is the musk of the glands held precious (or was, not long ago), but other parts of the animal were used for medicinal purposes. Hasselquist notices the 'folliculus,' of the bigness of a hazel-nut, under the shoulders of the old crocodiles, containing a thick matter which smells like musk. The Egyptians, he says, are very anxious to get this when they kill a crocodile, it being a perfume much esteemed by the grandees, but Hasselquist did not find one in any that he dissected. Nor was it likely that he should, if he looked for the folliculus under the shoulders; though he might have found it under the jaws. He states that the Egyptians use the fat against the rheumatism and stiffness of the tendons, esteeming it a powerful remedy outwardly applied. He mentions the gall, as being considered good for the eyes; and that, and the eyes of the crocodiles themselves, as used by the Egyptians for purposes about which we care not to be particular.

I am not aware that a true crocodile has ever been exhibited alive in this country. I never saw one, though

I have seen many alligators of all sizes.* It would not be very difficult to bring over a Nilotic crocodile; and if the Zoological Society of London were to show one with its attendant dotterell and the hippopotamus,† the attraction would be strong. The clever keepers of that establishment would soon reconcile them to each other, and present another 'united happy family' to the wondering spectators.

Without wearying the reader with anatomical details, we would draw attention to certain peculiarities in the organization of the crocodilian family, which are not only essential to its well-being, but indicate that approximation of one form to another, of which every observer who studies animated nature is constantly reminded.


The cervical vertebræ are furnished with a sort of false ribs, which impede lateral motion; and, indeed, the general structure of the vertebral column, as far as the pelvis, combined with the abdominal ribs, renders it difficult for the *crocodilidæ* to bend their bodies side-

* I shall endeavour, hereafter, to describe the difference between these two cognate forms. Some will think this superfluous, especially if they remember the answer of the brightest legal wit of his day, who, when asked what was the difference between a solicitor and an attorney, replied, 'The same as between a crocodile and an alligator.'

† 6th Oct.—I to the Zoological Garden, and in my way to the hippopotamus came upon a late hatch of six young black swans not long out of the egg, walking with their affectionate mother, the proud father strutting in advance ready to do battle with all comers, and as if he defied the world. Looked in upon Jenny Lind, who had broken her horn at the base, or rather loosened it at the suture, so that it went quite back. But the keeper set it cleverly, and it is now in place, exalted, like that of her namesake by Brother Jonathan; so that she carries her head as proudly and symmetrically as any giraffe of them all.

The great tortoise had cuddled into a corner of his house, as if he felt the approach of winter.

Hippo was in his bath. When he sinks he puts back his ears, and closes them to keep out the water. A large vegetable marrow was thrown to him by Hamet. He mumbled it for some time in



ways; whence the notion of throwing them out, when in pursuit, by doubling back. There is a story of an Englishman running before a large alligator which came out of the lake Nicaragua, and was gaining on him fast. He would have been soon overtaken by his grim pursuer, had not some Spaniards called to him to run in a circle, and baffle it by compelling it to resort to the laborious operation of turning, if it should be bent on continuing the pursuit. That an alligator can bend its body *and tail* so as to bring head and tail together I have proved. I took an alligator between five and six feet long, at the Zoological Garden in the Regent's Park, by the tail, and lifted it off its legs, when, by what certainly appeared to be a violent effort, it bent its body so as to reach my hand with its head. I had a glove on, but the reptile bit it through, without, however, wounding my hand.

The abdominal ribs, which form a sort of plastron for the protection of the belly, in addition to the false and ordinary ribs, do not reach up to the spine, and seem to

the water, and below the surface as well as above, making an impression on the fruit but not breaking it. When below the surface he would let it out of his mouth, and then rise after it as it floated to the top, trying his young teeth upon it. At last his vegetable appetite appeared to be roused. He brought it to one of the steps of his bath, and, reposing, set to work upon it in good earnest, with all but his head still in the water, succeeded in breaking it, bit off pieces, chewed them with a slow, champing, snapping motion, without any lateral grinding, and swallowed them. He had previously been offered green maize, which he mumbled, broke, and played with, but did not eat, so far as I could see. Boiled carrots and kohl-rübe were more to his taste; and he had eaten freely of them before the experiment of the raw vegetable marrow was made. All this looks like a healthy state of stomach, and I cannot help hoping that his careful attendants will bring him through the winter. He was rather fractious at first on being left, but is now reconciled to the absence of his kind Hamet at night, and sleeps by himself very comfortably. In short, his conduct entirely justifies the epithet conferred on him by Mr. Dickens, who has immortalized 'The Good Hippopotamus.'

be the result of an ossification of the tendinous portion of the recti muscles. True clavicles there are none, but, as in the rest of the Saurian tribe, the coracoïd apophyses are attached to the breast-bone. The lungs of reptiles generally reach down into the abdomen ; but such is not the case with the crocodilians, and some fleshy fibres adhering to that part of the peritoneum which covers the liver, remind the observer of a diaphragm. This organization, combined with their trilocular heart, where the blood coming from the lungs is not mingled with the venous portion of that fluid, which comes from the body, so completely as it is in other reptiles, approximates, though in no great degree, the crocodilians to the warm-blooded quadrupeds. As in the tortoises, the auditory bone and the pterygoïd apophyses are fixed to the skull.

But the jaws, which in the chelonians are edentulous, are furnished with numerous large conical teeth of unequal length, implanted in a single row in the thickness of the upper and lower maxillary bones, in separate cavities, each of which may be looked upon as a true alveolus or socket. This formidable array is constantly kept up in good order and condition by a provision which insures a constant supply of serviceable teeth. Each tooth is hollowed at the base, so as to become the case or sheath of the tooth, of greater size, destined to replace it ; so that, in the crocodiles, the operation of teething is always painlessly going on : nor does the number of the teeth vary according to age. The pressure of the rising tooth causes an absorption of the hollow base of the old one ; and as the former advances the latter dwindles, till it drops out and is succeeded by the new one. It need hardly be observed, that great solidity and strength result from this double *gomphosis* ; while, to add to the firmness of the terrible apparatus, the sockets are directed obliquely from front to rear. Each tooth is, so to speak, insulated ; and a gum, or at least what does

duty for a gum, covers the bony edges of the jaws whence they spring.


The depressed and elongated body and tail are shielded on the back by solid carinated scutcheons. The scales of the belly are squared, comparatively delicate, and smooth. The tail is longer than the body, compressed laterally, and its scales are elevated into a central ridge. The fore-feet are furnished with five toes, the hind-feet with four. All the toes are armed with claws, and more or less webbed. The nostrils open at the end of the muzzle, and are raised and furnished with crescent-shaped slits. This elevation is very strongly marked in the Gavials or Gharrials, and enables the animal to lie floating with the nostrils above the water without exposing much of the head. They are closed by valves when the creature descends. The fleshy flat tongue is attached very nearly up to the edges ; whence the notion of the ancients that the crocodile had none. This conformation prevents, in a great measure, the routing out of leeches, &c. by muscular action, and accounts for the necessity of external aid in freeing the mouth from annoying parasites. The lower jaw is prolonged backwards beyond the skull, and the gape is proportionably elongated. Hence, when the animal raises its head and throws it a little backwards on opening the mouth by the depression of the lower jaw, it has the appearance of moving its upper jaw, whence the error of the ancients in that respect.

Cuvier observes that the crocodiles cannot swallow when in the water, but the evidence of those who have seen alligators in their fishing expeditions hardly supports this assertion. It is true that such witnesses relate, that after having seized the fish beneath the surface, the captor rises above it, and occasionally tosses the prey into the air, as if to get rid of the water taken in at the time of the seizure : but there can be no question that, on such occasions, the fish is swallowed by the alligator

without leaving the water ; though the latter repairs to the land for the purpose of devouring such land animals as it may have succeeded in surprising and drowning, after they have undergone such a degree of decomposition as renders their fibre tender and more easily divided by crocodilian teeth. With all due submission, then, to the high authority of the great French zoologist, his position may be doubted ; and, indeed, the careful adaptation of a part of its organization to the requirements of the animal goes far to contradict it. This conformation we shall endeavour to explain with as little technicality as possible.

If the interior of the mouth of a crocodile or alligator be examined, the roof of the palate will be found nearly flat, and not pierced by the extremities of the nasal *fossæ*, as in the greater number of other reptiles. No ; the posterior nasal apertures open in the pharynx behind the palatine veil, which is sufficiently elongated to overspread that portion of the roof which is in front of the glottis, or opening of the windpipe. Indeed, it is probable that the crocodiles are the only reptiles that have a true pharynx—in other words, a vestibule common to the mouth, the posterior nostrils, the larynx or windpipe, and the œsophagus or gullet. This arrangement of the parts in combination with the muscular structure of the tongue, the bone of which, or *os hyoides*, has a peculiar expansion, produces a sort of disk or valve, which can be lifted and applied to the *velum palati* above, so as effectually to protect the glottis, and perform the office of the *epiglottis* in mammiferous animals, conferring on the crocodile a peculiar power of deglutition and respiration when it has seized its prey below the surface of the water, or has dragged it down from the land. The same admirable machinery comes also into play in carrying on respiration, when the animal lies with its muzzle alone above the surface of the water.

The eggs of the crocodile are covered with a hard



shell, and are as large as those of a goose, but not so oval. The female is said to guard the nest or place of deposit, and to bestow maternal care upon the young during some months.

The form is widely spread. Asia, Africa, and America have it. There is no authentic record of its ever having inhabited Europe, in the present state of the world at least; unless we are to give credit to the assertion of Malte-Brun, that one was taken in the Rhone some two centuries ago. The fifth quarter of the globe, Australasia, has not as yet been found to possess it. The muzzle of the crocodiles is not so wide as that of the alligators or caymans; and some of the Asiatic species, the gavials* for example, have the jaws elongated into a narrow snout, with a rounded termination, reminding one in some degree of the beak of a gigantic spoonbill armed with teeth. The alligators, according to some, derive their name from the Portuguese word *lagarto*, signifying a lizard; some make it a modification of the Indian word *legateer*, or *allegater*; and others, again, suppose that it is simply a corruption of the words *al lagatore*,† the inhabitant of the lake or lagoon—for travellers agree generally in stating that the caymans are never found in the rapids, or even in the running parts of the stream, but in creeks, lagoons, or back waters. There is this difference, also, between them and the true crocodiles, that whereas the latter frequently descend beyond the brackish water of great rivers, even into the sea—the greater species that inhabits the Ganges, for example,—and have been known to swim from island to island where the distance has been considerable, no such migrations have been generally recorded on the part of the alligators, which, it has been said, never quit the fresh

* More properly, *garrhiäls*.

† Sloane, who writes *allagator*, *allegator*, *alagarta*, and *alagartos*, derives it from the Spanish *alagarta*, a lizard.

water.* When, after the intense heats of summer, the cold season approaches, the alligators bury themselves in the mud of some stagnant pool, and there remain concealed and comfortable, in the sort of death-in-life state of hybernation, till the genial breath of spring calls them again into active existence. Then, and as the summer advances, multitudes may be seen in the unfrequented waters of South America, their huge flat heads floating among the luxuriant nymphææ—such as Queen Victoria's own water-lily, and other aquatic plants, with which the surface is, as it were, carpeted,—or basking on the sunny banks in a dozing state, when the day is at the hottest. They probably have a feathered attendant, as the true crocodiles have, for a bird has been seen quietly perched on an alligator's snout.

Like the poacher, their principal time of fishing is in the night, when they assemble in large companies, drive the fish before them, with loud bellowings that may be heard a mile off, into some retired creek, and take up a position at the mouth of it. Then the work of destruction begins. Diving under the crowded shoal, the alligators seize the prey, not unfrequently using their tails to sweep the terrified fish, which attempt to escape, towards their gaping mouths, while the shores resound with the clanking of their jaws. Some have supposed that the musky secretion of the glands beneath the

* But note. Sir Hans Sloane, in his *Jamaica*, speaking of the shoals between Port Royal and Passage Fort, and of the corals, starfishes, and echini, which there abound, says that 'alligators are often drawn on shoar in the *senne*-nets by the fishermen, whose nets are generally broken by them;' and he speaks of one which was afterwards taken, as stated at p. 331 of this book, that used to do abundance of mischief to the people's cattle 'in the neighbourhood of this bay, having his regular courses to look for prey.' And Sloane further remarks, that 'They are very common on the coasts and deep rivers of Jamaica.' Catesby, too, states, that they frequent salt rivers near the sea, as well as streams of fresh water, fresh and salt lakes.

throat has attraction for the fish, as the anglers of old were used to anoint their baits with perfumed unguents to draw the finny race to their hooks. But, although fish form the principal food of the alligators, they not unfrequently seize on land animals, which, if too large to be swallowed whole, they sink beneath the bank, till it becomes what venison-eaters term rather high, when it is brought out and devoured at leisure on the bank. Some of them have been known to attack men while bathing or swimming across rivers ; and there goes a saying, that they prefer the flesh of a negro to any other delicacy. Sonnini, when he notices the belief above referred to, that the Christian bears a charmed life against the crocodile, while the Mussulman is devoured, states that he has read somewhere, that in Western Africa the reptile not only prefers the negro, but never touches the white Christian.

Like several fishes, gold and silver fish and carp for example, the alligators live at their ease in waters of a very high temperature. Bartram found great numbers, both alligators and fish, in a spring near the Mosquito River, in Florida, strongly impregnated with vitriol, and nearly at boiling point where it issued from the earth.

At St. Domingo, M. Ricord had opportunities of witnessing the mode in which reproduction is carried on among the crocodilians of that island. In April and May, he tells us, the female deposits from twenty to twenty-five eggs, more or less, in the sand, without much care, and indeed hardly covering them. He met with them occasionally in the lime which the masons had left on the river's bank. According to his reckoning, and if the temperature be sufficiently genial, the young come forth five or six inches in length on the fortieth day. They are hatched without aid, and as they are able to exist without nourishment while extricating themselves from the egg, the female is in no haste to bring it to

them ; but she leads them towards the water and into the mud, where she disgorges half-digested food for their nourishment. The male, he says, takes no notice of them. They retain for some time the umbilical cicatrice whereby the vitellus was absorbed while they were in the egg.*

Like the young turtles, many of them are destroyed by their numerous enemies in their way to the river, and before they get into deep water. Vultures devour them both in the egg and on their exclusion ; and ravenous fishes thin their ranks as soon as they reach the element in which those who survive are to pass so much of their existence.

The flesh of alligators is eaten by the Indians, and I have been assured by those who have partaken of it, that the tail of a young alligator, sliced and treated like veal cutlets, bears no distant resemblance to that dish.

Of their ravenous and ferocious disposition there can be little doubt, and stories illustrative of it are not uncommon. Bontius relates, that a man who had conducted a horse to drink was fiercely attacked by an enormous one, and if the latter had not suddenly sprung away, both man and horse would have been in danger of their lives. Acosta records the bravery of an Indian father, whose little son had been seized by an alligator, that plunged with his prey into the depths of the river.

* A collector who had taken the contents of one of these nests, brought the eggs to the house where he was living, and put them into his room on the first floor. One day he went out, leaving the door of his room open, and on his return beheld a swarm of young alligators coming down stairs. Another procured a number of these eggs just before he sailed for England, and put them into one of his chests. Towards the end of the voyage he had occasion to open the chest where he had stowed away the eggs, and found a legion of these black imps among his shirts and stockings. Some of these young alligators arrived alive and well in this country.

The father, a strong and skilful swimmer, armed with a short sword, leaped in after the reptile, dived under it, and by a succession of vigorous stabs in the belly compelled the monster to make for the bank, where it deposited the child half-dead. Mr. Waterton is not the only rider who has bestriden one of these river Bucephali. *He* mounted an alligator. Adanson witnessed and shared in an engagement with a true crocodile. The negroes, it appears, in the neighbourhood of the river Senegal, boldly attack these monsters; and on one occasion a negro discovered a crocodile seven feet long asleep, among some bushes at the foot of a tree near the banks of the river. The negro stealthily crept up, and inflicted a deep wound on the side of the reptile's neck. The crocodile with one sweep of his tail knocked the negro off his legs; but he rose instantly, and slipped a rope over the crocodile's muzzle, while one of his companions secured the formidable tail. Then Adanson leaped on the crocodile's back and kept it down, while the negro drew out the knife, which he had left sticking in the wound, and cut off his antagonist's head. Another author mentions one of the garrison of Fort St. Louis who used frequently to amuse himself with these duels, and always with success: till at last he was so terribly wounded in one of those combats, that he must have been killed outright if some of his comrades had not come to the rescue.

Sir Hans Sloane was offered the stuffed skin of an alligator nineteen feet long when he was at Jamaica, but he could not accept of it on account of its size, 'wanting room to stow it.' The story of its capture, as related by him, is curious. The people in the neighbourhood of the bay between Port Royal and Passage Fort having suffered great loss of cattle by its depredations, a dog was used as a bait, with a piece of wood tied to a cord, the farther end of which was made fast to a bed-

post. The reptile, coming round as usual every night, seized the dog, was taken by the piece of wood, which stuck across his throat, in his struggles drew the bed to the window, and waked the people, 'who kill'd the alligator which had done them much mischief.' Sir Hans also records that there was 'a pottle of stones' in the belly of one nine feet long. Ravenous as the alligators are, they are, like serpents and tortoises, capable of enduring a very long fast. Browne, in his *Natural History* of the same island, which Sloane so ably illustrated, remarks that they are observed to live for many months without any visible sustenance; which experiment, he says, is frequently tried in Jamaica by tying their jaws with wire, and putting them, thus tied up, into a pond, well, or water-tub, where they often lie for a considerable time, rising to the surface from time to time for breath. He also asserts, that on opening the animal the stomach is generally found charged with stones of a pointed oval, but flattened shape, to which they seem to have been worn in its bowels.

Doubtless (adds the worthy Doctor) it swallows them, not only for nourishment, which is evident from the attrition and solution of their surfaces, but also to help its digestion, and to stir up the oscillations of the slothful fibres of its stomach, as many other creatures do. Some people think it swallowed them to keep them easier under water at times; but how reasonable soever this conjecture may seem to some people, it will not take with such as are better acquainted with the nature of aquatic animals.

Catesby* thus draws their portraits:—

In Jamaica, and many parts of the continent, they are found above twenty feet in length; they cannot be more terrible in their aspect than they are formidable and mischievous in their natures, sparing neither man nor beast they can surprise, pulling them under water, that, being dead, they may with greater facility, and without struggle or resistance, devour them. As quadrupeds do not so often come in their way, they mostly subsist on fish; but

* *Carolina.*

as Providence, for the preservation, or to prevent the extinction of defenceless creatures, hath, in many instances, restrained the devouring appetites of voracious animals by some impediment or other, so this destructive monster, by the close connexion of the joints of his vertebræ, can neither swim nor run any other ways than straightforward, and is consequently disabled from turning with that agility requisite to catch his prey by pursuit. Therefore they do it by surprise, in the water as well as by land; for effecting of which Nature seems, in some measure, to have recompensed their want of agility, by giving them a power of deceiving and catching their prey, by a sagacity peculiar to them, as well as by the outer form and colour of their body—which on land resembles an old dirty log or tree; and, in the water, frequently lies floating on the surface, and there has the like appearance,—by which, and his silent artifice, fish, fowl, turtle, and all other animals, are deceived, suddenly caught, and devoured.

Catesby also mentions their habit of swallowing stones and other hard substances, not, as he thinks, to help digestion, but to distend and prevent the contraction of their intestines when they are empty. In the greater number of many which he opened, nothing appeared but chumps of light wood and pieces of pine-tree coal, some of which weighed eight pounds, and were reduced and worn so smooth from their original angular roughness, that they seemed to have remained there many months.

Dr. Buckland, in his *Bridgewater Treatise*, well observes, that in the living subgenera of the crocodilian family we see the elongated and slender beak of the gavial constructed for feeding on fishes; whilst the shorter and stronger snout of the broad-nosed crocodiles and alligators gives them the power of seizing and devouring quadrupeds that come to the banks of rivers in hot countries to drink. As there were scarcely any mammalia during the secondary periods, while the waters were abundant, we might, *à priori*, expect, he remarks, that if any crocodilian forms then existed, they would most nearly resemble the modern gavial. Accordingly, those genera only which have elongated beaks have been

found in formations anterior to, and including the chalk; whilst the true crocodiles, with a short and broad snout like the alligator, appear for the first time in strata of the tertiary periods, in which the remains of mammalia abound.

Though neither crocodile nor alligator exists in Europe, nor ever, I believe, has existed there since that quarter of the globe was peopled, there was a time when this now temperate island must have teemed with animals only able to exist in warm latitudes, and when its hotter clime presented a congregation of all the crocodilian forms now so widely scattered and separated. What geographical changes has the world undergone since that time! How different was the face of this fair island before the eocene deposits were formed!

At the present day the conditions of earth, air, water, and warmth, which are indispensable to the existence and propagation of these most gigantic of living saurians, concur only in the tropical or warmer temperate latitudes of the globe. Crocodiles, gavials, and alligators now require, in order to put forth in full vigour the powers of their cold-blooded constitution, the stimulus of a large amount of solar heat, with ample verge of watery space for the evolutions which they practise in the capture and disposal of their prey. Marshes with lakes—extensive estuaries—large rivers, such as the Gambia and Niger, that traverse the pestilential tracts of Africa—or those that inundate the country through which they run, either periodically, as the Nile for example, or with less regularity, like the Ganges, or which bear a broader current of tepid water along boundless forests and savannahs, like those ploughed in ever-varying channels by the force of the mighty Amazon or Oronooko,—such form the theatres of the destructive existence of the carnivorous and predacious crocodilian reptiles.*

Well may the gifted Professor ask, What must have been the extent and configuration of the eocene continent which was drained by the rivers that deposited the masses of clay and sand, accumulated in some parts

* Owen's *History of British Fossil Reptiles*, now in course of publication.

of the London and Hampshire basins to the height of one thousand feet, and forming the graveyard of countless crocodiles and gavials? whither trended that great stream, once the haunt of alligators and the resort of tapir-like quadrupeds, the sandy bed of which is now exposed on the up-heaved face of Hordwell Cliff?

No one is better qualified to give an answer to such questions than the deep-thinking and eloquent querist. Everything must fade after the vivid picture here presented, and with it we close the scene :—

Had any of the human kind existed and traversed the land where now the base of Britain rises from the ocean, he might have witnessed the gavial cleaving the waters of its native river with the velocity of an arrow, and ever and anon rearing its slender snout above the waves, and making the banks re-echo with the loud and sharp snappings of its formidably-armed jaws: he might have watched the deadly struggle between the crocodile and palæothere, and have been himself warned by the hoarse and deep bellowings of the alligator from the dangerous vicinity of its retreat. Our fossil evidences supply us with ample materials for this most strange picture of the animal life of ancient Britain, and what adds to the singularity and interest of the restored *tableau vivant* is the fact, that it could not now be produced in any part of the world. The same forms of crocodilian reptiles, it is true, still exist, but the habitats of the gavial and the alligator are wide asunder, thousands of miles of land and ocean intervening: one is peculiar to the tropical rivers of continental Asia, the other is restricted to the warmer latitudes of North and South America; both forms are excluded from Africa, in the rivers of which continent true crocodiles alone are found. Not one representative of the crocodilian order naturally exists in any part of Europe; yet every form of the order once flourished in close proximity to each other, in a territory which now forms part of England.

December, 1850.

CHAPTER XIII.

METTEZ les deux chameleons ensemble,
Celuy d'Egypte, et celui d'Arabie :
On trouvera difference en leur vie,
Mesme en couleur l'un l'autre ne ressemble,

says the quatrain with which the portrait of the chameleon* is enriched in the *Portraits d'Oyseaux, Animaux, Serpens, Herbes, Arbres, Hommes et Femmes, observez par P. Belon du Mans*, and the record is true. Of this curious form of the lacertine race there are several species, and every year many arrive in this country to linger out an unnatural existence of a few weeks.

In a state of freedom, and in its natural haunts, the chameleon would seem to be a very different being from the torpid invalid seen here in confinement. Hasselquist speaks almost rapturously of it, calling it an 'elegant creature.' He tells us that it is frequently found in the neighbourhood of Smyrna, particularly near the village Sedizeud. There he describes it as climbing the trees, and running among the stones. The people of the country told him that it lived in hollow trees. Hasselquist was not an eye-witness of this habit; but often saw it climb on the branches of the olive, plane, and other trees. He had seen the chameleon of Egypt; but observes that it is less than the Asiatic, and is not often met with.

When Hasselquist made all the inquiry he could con-

* The ancients wrote of an herb of the same name which grew among the rocks on the sea-shore, and was said to change the colour of its flowers thrice a-day.

cerning the nature of the animal, in a place where it was so frequently found, the inhabitants told him that it would assume the colour of a piece of cloth, or other painted or coloured substance, which might be put before it. Some assured him that it lived only on air, but others told him that they had seen it catching a sort of very small flies.

When the hypocritical king inquires, 'How fares our cousin Hamlet?' the Prince of Denmark replies, 'Excellent, i'faith, of the camelion's dish: I eate the ayre promise-cramm'd, you cannot feed capons so.'

These qualities, of changing colour and living on air, have been attributed to it from the earliest times. The first is well founded; the last fabulous, but the fable has been fortified by the power possessed by the reptile of living in apparently good health for a long time—many weeks—without visibly taking any sustenance.

In the stomach of one dissected by Hasselquist, he found the remains of various insects,—tipulæ, coccinellæ, and butterflies; and, in its droppings, he found part of an entire ear of barley, which he characterises justly as very singular.* He kept one alive for a considerable time, and applied himself to observations on its habits.

He could never see that it assumed the colour of any painted object presented to its view, though he made many experiments with all kinds of colours, on different things—flowers, cloth, paintings, &c. Its natural colour was iron-gray, or black mixed with a little gray. This it sometimes changed, and became entirely of a brimstone yellow. That was the colour which he saw it most frequently assume, with the exception of the hue first mentioned. He had seen it change to a darker yellow,

* The presence of the grain may be accounted for by the presence of an insect on it, when the chameleon, with the tip of its adhesive tongue, may have brought away the grain with its natural prey.

approaching somewhat to a green, sometimes to a lighter; at which time it was more inclined to a white than a yellow. He did not observe that it assumed any more colours; such as red, blue, purple, &c.; and, for that reason, was inclined to believe that all which has been said concerning the changing and shifting of colours in this animal, consisted only in this, that on certain occasions it changes the dark colour, which seems to be natural to it, into yellow of various shades. He observed that his reptile more particularly did it on two occasions; one was, when he exposed it to the hot beams of the sun; and the other, when he made it angry by pointing at it with his finger. When it was changing from black to yellow, the soles of its feet, its head, and the bag under its throat, began first to alter,—an alteration which was afterwards continued over the whole body. He saw it several times speckled, or marked with large spots of both colours over the whole body, which gave it an elegant appearance. When it was of an iron-gray colour, it extended its sides or ribs and hypochondria, which made the skin sit close to the body, and it appeared plump and handsome; but, as soon as it turned yellow, it contracted those parts, appearing thin, empty, lean, and ugly; and the nearer it approached in colour to white, the emptier and uglier it seemed; but it appeared worst, in regard to shape, when it was speckled.

Hasselquist kept this creature alive from the 8th of March to the 1st of April, without affording it an opportunity of taking any food. This is much to be regretted, because, in its native climate, there can be little doubt that, from its vivacity, it would have fed freely, and the powers of abstinence of the animal had been tested again and again. Notwithstanding its fast, it was nimble and lively during the greater part of the time, climbing up and down in its cage, fond of being near the light, and constantly rolling its eyes. At last Hasselquist could

plainly perceive that the victim waxed lean and suffered from hunger; but the Swede was obdurate, though he saw that it could no longer hold fast by the bars of its cage, from which it fell through weakness, when a turtle, a *thirsé* probably, which was kept in the same room, bit it, and hastened its death.

Before I came to the resolution induced by the death of poor Binny, my tame beaver, a friend gave me a living chameleon, which remained with me nearly two months. It was winter, and every precaution was adopted to make the poor reptile as comfortable as possible. It lived in a wicker cage, to the bars of which it clung with feet and tail; but, after it had been with me a few days, it would leave the cage and establish itself on the ornamental work of the iron fender before the fire. Soon it began to recognise me, surveying me with a knowing roll of its singular optics, opened in the centre of the shagreen-like globes of the eyes. It then would leave the bars of the cage for my hand, the warmth of which seemed to comfort it, and would remain in it till I transferred it to the warm fender, which was its favourite post. Clinging with its feet and tail, with one eye directed backwards towards me, and with the other forwards, scanning the fire as if it were looking for the faces of other chameleons in it, the creature would remain motionless for hours, enjoying the genial temperature. During the whole time it was with me it never took any nourishment, though meal-worms and other insects were procured for it. When they were presented it would roll its eye and bring it to bear upon them; but neither Mrs. M., the good old housekeeper, who was so fond of Binny, nor myself, ever saw it take one, nor was one ever missed from among those presented to it. The housekeeper was at her wits' end what to do for it, till at last she became pacified, fully believing that it fed upon air; for, notwithstanding its abstinence, it did not apparently fall away. But it was distressing to watch

its strict fast day after day, and yet day after day I hoped this long fast would be broken, and did not like to abandon it. I was the more anxious to get it to feed, because it was full of eggs in the progress of development, which must have made great demands on its constitution, and I had frequently seen chameleons take insects freely; of which more anon. One facetious friend would never call it anything but Martha Taylor, in memory, I suppose, of the fasting woman of Derbyshire, who, in consequence of a blow on the back, fell into such a prostration of appetite, that she took hardly any sustenance, but some drops with a feather, from Christmas, 1667, for thirteen months, sleeping but little all the time. After laying a large number of apparently perfect eggs, my chameleon died; and Mrs. M. announced the event to me as 'a happy release.'

Le Bruyn, in his *Voyage to the Levant*, declares that the chameleons which he kept in his apartment at Smyrna lived on air, adding, however, that they died one after another in a short time. Sonnini, who saw several of them at the entrance of the catacombs at Alexandria, wishing to satisfy himself how long they could subsist without food, employed every precaution to prevent their having any, leaving them, however, exposed to the open air. They lived under these conditions for twenty days, but soon began to dwindle. When they were first caught they were plump, but they soon became very thin. They gradually lost their agility and their colours with their good condition; their skins became livid and wrinkled, and adhered close to the bone; so that, to use his own expression, they had the appearance of being dried before they ceased to exist. The apparent good condition of my chameleon may have been due to its good plight when I received it; most oviparous animals, at the time when the eggs are in the early process of formation, being well fed and filled, as we see in

the case of fish. As the eggs are developed the system is drained, till, at last, when they are fully formed, the fish is nearly worthless as food, all its goodness having gone into the roe. In the case of insects—the silk moth,* for example—no sustenance is taken after the worm has woven the shroud, from whose cerements it is to burst forth made perfect. The *imago* has every sign of a well-filled system, till, in obedience to the great law of nature, the eggs are laid, and the parents having finished the work which they were appointed to perform, die without having any support, save that which they derive from the sun and air. The power of abstinence, even in those warm-blooded animals whose food is not always ready for them—the carnivora, for instance—is very great; and in the reptiles generally most remarkable. The belief that the chameleon fed on air only was general amongst the ancients. The mode in which it gulps the air for respiration favoured this notion.

Chameleon hiat, ut tenui depascitur aura,
 Reciprocumque soli per sata carpit iter.
 Indicat ac varios semper mutatque colores,
 Mutat hians faciem, mutat hians chlamydem.
 Candidaque induitur nunquam, nec rubra supellex,
 Semper hiat zephyros, semper hiat stimulos.

And long before these lines were written, the amorous Roman† had celebrated the ærial diet and mutability of the creature.

Id quoque quod ventis animal nutritur et aura
 Protinus assimilat tetigit quoscunque colores.

Red and white were supposed to be the colours which it could never assume, as indicated in the first lines above printed. The former colour no one has recorded as visible upon the chameleon's skin throughout; but the latter has been mentioned both in prose and poetry. A *vir nobilissimus fide dignus* related to Aldrovand, that

* *Phalæna mori*.

† *Metam.* lib. xv.

he wrapped up one which had been presented to him in a white handkerchief, and when he arrived at home proceeded to open it in order to examine the animal, but could see nothing but the handkerchief. At last he detected the chameleon, which had so completely acquired the whiteness of the wrapper as to be invisible.

The gentlemen who nearly lost their temper in disputing about the colour of one of these reptiles were all put in the wrong by him who

Produc'd the beast, and, lo ! 'twas white.

My experience supports the conclusions of Sonnini and Milne Edwards as to the mutability of colour. When the chameleon kept by me first came into my possession, and was comparatively vigorous, substances of various colours were placed near it without its ever altering its hue accordingly, as far as I could perceive. It would roll its eye and bring it to bear on the object, and sometimes the tints of the skin would vary, but not in unison with the adjacent colour. When it was clinging to the dark bronze-work of the fender, enjoying the heat of the fire, I sometimes thought that its hue became more sombre; but this effect was by no means constant. Gray, Isabella colour, and pale yellow, with the spots or granules varying into green, grayish or blackish, were the prevailing changes; but I never saw it white. I have seen it of a whitey-brown colour; and such was its prevailing hue in its latter days, and at its death.

The French Academicians seem to have come to the conclusion, that the sun was a principal agent in such changes. They describe the colour of the eminences of their chameleon, when it was at rest in the shade and had remained a long time undisturbed, as of a bluish gray, except under the feet, where it was white inclining to yellow, and the intervals of the granules of the skin were of a pale and yellowish red. This changed when the animal was in the sun; and all the parts of its body which

were illuminated altered from their bluish colour to a brownish gray inclining to tawny. The rest of the skin, which was not illuminated by the sun, changed from gray into several lively shining colours, forming spots about half a finger's breadth, reaching from the crest of the spine to the middle of the back; and others appeared on the ribs, forelegs, and tail. All the spots were of an Isabella colour, through the mixture of a pale yellow, with which the granules were tinged, and of a bright red, which was the colour of the skin that was visible between the granules; the rest of the skin not in the sun's light, and which was of a paler gray than ordinary, resembled a cloth made of mixed wool, some of the granules being greenish, others of a tawny gray, and others of the usual bluish gray, the ground remaining as before. When the sun ceased to shine, the original gray appeared again by degrees, and spread itself all over the body, except under the feet, which continued nearly of the same colour, but rather browner. When, in this state of colour, it was handled by strangers, several blackish spots about the size of a finger-nail appeared, a change which did not take place when it was handled by those who usually took care of it. Sometimes it was marked with brown spots, which inclined towards green. It was wrapped in a linen cloth, and, after two or three minutes, was taken out whitish, but not so white as that which the *vir nobilissimus* above alluded to subjected to a similar experiment. Theirs, which had only changed its ordinary gray into a paler gray, after having retained that colour some time, lost it gradually. This experiment made them question the truth of the allegation that the chameleon takes all colours but white, as Theophrastus and Plutarch report; for theirs seemed to have such a disposition to retain this colour that it grew pale every night, and when dead it showed more white than any other colour. Nor did they find that it changed colour all over the body, as Aristotle

reports; for, according to their experience, when the animal takes other colours than gray, and disguises itself to appear in masquerade, as *Ælian* pleasantly observes, it covers only certain parts of the body with them. They, finally, laid their chameleon on substances of various colours, and wrapped it up in them; but it did not take those colours as it had taken the white, and, indeed, they allow that it only took the white the first time the experiment was made, though it was repeated several times and on different days.

Hasselquist's experiments with regard to the mutability of colour were followed by nearly the same consequences as mine; but he thought that the changes depended on a sort of disease, a kind of jaundice, to which the animal was subject, particularly when it was irritated.

The blood, in the opinion of *M. d'Obsonville*, was the cause of the change. That fluid, according to him, is, in the chameleon, of a violet blue, which colour, he says, it will retain on linen or paper for some minutes, if it be previously steeped in a solution of alum. The coats of the blood-vessels he found to be yellow, both in their main trunks and ramifications, and he comes to the conclusion that green will be the product. Like *Hasselquist*, he attributes the change of colour to the passions of the creature. He holds that, when a healthy chameleon is provoked, the circulation is accelerated, the vessels spread over the skin distended, and so a superficial blue-green colour is produced; but when the animal is shut up, deprived of free air and impoverished, the circulation becomes sluggish, the vessels are not well filled, and the languid chameleon changes to a yellow-green, which continues during its imprisonment.

Others, the late *Sir John Barrow* for instance, have observed that, previous to a change, the chameleon makes a long inspiration, when the body is inflated so as to appear twice its usual size, and as the inflation subsides,

the change of colour is gradually manifested, the only permanent marks being two small dark lines along the sides; and it has been argued, from this description, that the reptile owes its varied tints to the influence of oxygen. Mr. Houston is also of opinion that the change depends on the state of turgescency of the skin; and Mr. Spittal regards it as connected with respiration and the state of the lungs. Theories upon theories, as varied as the tints which they profess to explain, have been broached to account for these changes; but, without dwelling longer upon them, let us turn to the solution of M. Milne Edwards, who, in an elaborate paper published in the *Annales des Sciences Naturelles*, for January, 1834, came to the conclusion that the colour of chameleons does not depend essentially on the greater or less inflation or expansion of their bodies, or the changes which might thence take place in the circulation or condition of the blood; nor on the distance between the several tubercles or granules of the skin; but, at the same time, he does not deny that those circumstances may probably exercise some influence. He shows that in the skin of these reptiles two layers of membranous pigment exist, one above the other, but so disposed as to appear simultaneously under the cuticle, and sometimes in such a manner, that the one may be hidden by the other; and he insists that everything remarkable in the changes of the chameleon's colour may be explained by the appearance of the pigment of the lower layer to an extent more or less considerable in the midst of the pigment of the upper layer, or by its disappearance beneath that layer. That these displacements of the lower pigment do actually occur he proves; and he derives from those facts the probable consequence, that the chameleon's colour changes, not only during life, but that it may vary after death. He also observes, that there is a close analogy between the mechanism which causes the changes of colour in

these lacertians, and that which governs the appearance and disappearance of coloured spots in the mantles of several of the cephalopods or cuttlea.

So long ago as July, 1819, Signor Giosué Sangiovanni read to the Royal Academy of Sciences, at Naples, his able and interesting paper, intituled *Descrizione di un particolare Sistema di Organi, e de' Fenomeni ch' esso produce; scoperto ne' Molluschi Cefalopodi*, in which he described the structure and properties of the colorific stratum of the skin of the *cephalopoda*, upon which the observations of M. Milne Edwards are in a great measure based. Professor Owen quotes it, in his admirable article 'Cephalopoda,' in the *Cyclopædia of Anatomy and Physiology*: and, as this part of the organization of those mollusks is the key to the changes of colour in the chameleon, those who are interested in the subject may like to see a brief account of the mechanism by which the changes are effected in the marine animals.

The epidermis of the cephalopods generally forms a thick, white, semi-transparent, elastic, external layer, which is easily detached by maceration. Professor Owen remarks, that the colorific stratum of the integument forms, both in its structure and vital phenomena, one of the most curious and interesting parts of the organization of this singular class of animals, and that the nature of this layer, when thoroughly understood, may be expected to elucidate the mysterious operations of light in producing and affecting the colours of animals. This stratum, which is analogous to the *rete mucosum* which gives colour, or 'complexion,' as it is termed, to man, consists, he observes, of a very lax and fine vascular and nervous cellular tissue, containing an immense number of small closed vesicles, which vary in relative sizes in different species. These vesicles are of a flattened oval or circular form, and contain a fluid in which a denser colouring matter is suspended. The colour is not always identical

in all the vesicles, but, in general, corresponds more or less closely with the tint of the secretion of the ink-bag with which this race is furnished as a protection; for, as is known to all who have observed their habits, their first act when surprised is to eject this inky fluid, *succus nigrae loliginis*, that they may escape under cloud of the discoloured water. In the common cuttle, *Sepia*, besides the vesicles which correspond to the ink in the colour of their contents, there is another series of an ochre colour. In the common pen-and-ink fish, *Loligo vulgaris*, there are three sorts of coloured vesicles, yellow, rose-red, and brown. In *Loligo sagittata*, there are four kinds—saffron, red, blackish, and bluish. The paper Nautilus, *Argonauta Argo*, possesses vesicles of all the colours which have been observed in other cephalopods, and hence the variety and change of colour which its skin presents when exposed to the light. The rest of this interesting organization will be best conveyed in the Professor's own words:—

These vesicles have no visible communication either with the vascular or the nervous systems, or with each other; yet they exhibit during the lifetime of the animal, and long after death, rapid alternating contractions and expansions. If, when the animal is in a state of repose, and the vesicles are contracted and invisible, the skin be slightly touched, the coloured vesicles show themselves, and in an instant, or sometimes with a more gradual motion, the colour will be accumulated like a cloud or a blush upon the irritated surface. If a portion of the skin be removed from the body and immersed in sea-water, the lively contractions of the vesicles continue; when viewed in this state under the microscope by means of transmitted light, the edges of the vesicles are seen well-defined, and to pass in their dilatations and contractions over or under one another. If the separated portion of integument be placed in the dark, and examined after a lapse of ten or fifteen minutes, all motion has ceased; but the vesicles, when re-exposed to a moderately strong light, soon, in obedience to that stimulus, re-commence their motions. As the vibratile microscopic cilia have been recently traced through the higher classes of the animal kingdom, it is not an unreasonable conjecture

that equally inexplicable motions of the colouring parts of the integument may also be detected in other classes than that in which we have just described them, and thus a clue may be obtained towards the explanation of the influence of geographical position on the prevailing colours of the animal kingdom.

This is a most seducing and interesting subject, well worthy of consideration and further experiment; but at present we must return to our chameleons. Just see how admirably the adaptation is carried on throughout. The free foot, formed in some of the other lacertians for running nimbly over the sand or through the herbage, with the aid of the disposition of the other limb bones, is here changed into an organ essentially prehensile. The two wrist-bones, which are next to those of the forearm, are articulated upon one central piece, which receives the five bones that correspond to the metacarpal. Three of these are for the anterior toes, and two for the posterior; and the whole five finger-bones are bundled up in the integuments to the claws, three in the fore bundle and two in the hind bundle, forming a most efficient clinging instrument when applied to the branch of a tree. The toes of the hinder extremities are disposed in the same opposable manner. The creature in its natural state, planted firmly among the foliage, and holding tenaciously on by its feet and tail, varying its colour at pleasure in the chequered light and shade, looks more like an excrescence of the tree than an animated being;* and woe to the luckless insect that, deceived by appearances, ventures within reach of its unerring tongue. For, though the shortness of its

* The *Tarandus* of Pliny will occur to those of our readers who are conversant with his wonderful magazine, where the beast is described as being as big as an ox, and, when he pleaseth, assuming the colour of an ass. But this is but a small sample of his versatility, for 'he reflects the colours of all shrubs, trees, flowers, and of the place where he lies, and hiding himself from fear, he is on that account very rarely taken.'—*Nat. Hist.* viii. 34.

neck and its enormous occiput forbid it to turn its head, which it can no more do than a carp or a codfish, the sweep of its vision is very great. Take up a chameleon's skull, and observe how large a space is occupied by the orbits. In these capacious receptacles ample room is afforded for the large globe and the muscles which are to direct it. The pupil looks like an animated gem set in shagreen, and this versatile globe is capable of the most varied and extensive direction. This, as worthy Dr. Goddard says, 'she turneth backward or any way, without moving her head; and ordinarily the one a contrary or quite different way from the other.'

But (as another old writer observes) what is most extraordinary in this motion is to see one of the eyes move whilst the other remains immovable; and the one to turn forward, at the same time that the other looketh behind; the one to look up to the sky, when the other is fixed on the ground. And these motions to be so extreme, that they do carry the pupilla under the crest which makes the eyebrow, and so far into the canthi, or corners of the eyes, that the sight can discern whatever is done just behind it, and directly before, without turning the head, which is fastened to the shoulders.

The vermiform tongue of the woodpecker is known to most who have shot one, and the same organ is the principal agent by which the chameleon takes its prey. Like that of the woodpecker, the tongue of the chameleon can be protruded to a considerable length. In the reptile, this organ is projected in a cylindrical and apparently erectile state from the sheath at the lower part of the mouth, where it remains when at rest, to the length of half-a-foot, and returns with a fly or other insect adhering to its glutinous tip, when the prey is secured within the teeth, which have no true roots, their trilobated crowns appearing to be soldered upon the edge of the upper part of a groove hollowed in the maxillary bone, and looking like an enamelled and denticulated finish to that edge.

I have frequently seen chameleons take their food, although I never could succeed in inducing my own to break its fast. When one of them is about to feed, it rolls its shagreen eyeball till the pupil is brought to bear upon the intended victim. Motionless and patient, the reptile waits till the insect arrives within distance. Then the extensile tongue is protruded with unfailing aim precisely to the extent required, and is retracted with the prey. I have seen them take mealworms frequently. When two mealworms were placed before a chameleon, one on one side and one on the other, at different distances, the eye of each side was levelled at the adjacent insect; and though the eyes were necessarily looking in different directions, the tongue did its duty upon both, one after the other, when they came within reach. The motion of extension and retraction was not very rapid, but it must be remembered that those seen by me were in confinement in this country.

So extraordinary a shape was not likely to be passed over by the ancients, without attributes as odd as the animal itself; and Democritus seems to have revelled in the marvellous qualities possessed by its several parts. Thus, we are told that this remarkable tongue, 'pulled out of the head whiles the chamæleon is quicke, promiseth good successe in judiciall trials,'—in compliment, doubtless, to the lawyers, who

Can with ease

Twist words and meanings as they please,

but are as unerring as the chameleon's organ in securing the substantial part of the litigation.

There is not a creature in the world thought more fearfull than it; which is the reason of that mutability whereby it turneth into such varietie of colours: howbeit of exceeding great power against all the sortes of hawkes or birds of prey; for, by report, let them fly and soare never so high over the chamæleon, there is an attractive vertue that will fetch them downe, so as they shall fall upon the chamæleon, and yeeld themselves willingly as a prey to be torne, mangled and devoured by other beasts.

Pliny, who quotes the Greek, goes on to inform us, that the same Democritus

Telleth us a tale, that if one burn the head and throat of the chamæleon in a fire made of oken wood, there will immediately arise tempests of rainy stormes and thunder together: and the liver will do as much (saith he) if it burne upon the tiles of an house. As for all the other vertues which the said author ascribeth to the chamæleon, because they smell of witchcraft, and I hold them meere lies, I will overpasse them all, unlesse they be some few for which he deserveth well to be laughed at, and would indeed be reproved by no other means better.

And yet the critic, in his eighth book, gravely informs us, that 'the raven, when he hath killed the chamæleon, and yet perceiving that he is hurt and poisoned by him, flieth for remedy to the laurell, and with it represseth and extinguisheth the venom that he is infected withall.' Others relate that if a crow tasted the flesh of the reptile, he was a gone crow.

Nevertheless, it is recorded that the inhabitants of Cochin China find them good meat,—by a process of cookery, however, somewhat similar to that directed by Mizald, when he instructs his scholars 'how to roast and eat a goose alive,' and after dwelling upon every particular of the diabolical process, winds up by declaring that 'it is mighty pleasant to behold!' The hapless chameleons were brought, we are told, to the Cochin Chinese market tied together in a string. The purchasers took them home, made a fine clear fire, unbound their chameleons, and then put them into the burning fiery furnace, where they at first endeavoured to walk on the glowing coals, but overcome with agony, fell down, were well broiled, taken out, their skins pulled off, and their *caro candidissima* minced fine, stewed in butter, and served up: *idque epularum genus apud ipsos in lautissimis cœnis commendatur.* Ude was but a plagiarist in the matter of the eels, after all.

It may be worth knowing in these days of semi-Thug-

gism, which throw those of the Mohocks into the shade, that 'the right forefoot of a chamæleon hanged fast to the left arm within the skin of a hyæna, is singular against the perils and dangers by thieves and robbers; as also to skar away hobgoblins and night spirits. In like manner, whosoever carry about them the right pap of this beast, may bee assured against al fright and feare.' Talk of fernseed for invisibility—Democritus will tell you that 'the *left* foote they use to torrie in an oven with the herb called also chamæleon, and with some convenient ointment or liquor to make in certain trosches, whereof if a man do carry any in a box of wood about him, he shall go invisible.'

In case of invasion, it is satisfactory to know that 'whosoever hath about him the right shoulder of the chamæleon, shall bee able to overthrow his adversarie at the barre, and to vanquish his enemie in the field;' but remember that, first, 'hee must be sure to cast away and make riddance of the strings and sinews belonging thereto, and to tread them under foot.'

In the ancient pharmacopœia, the chameleon was a perfect repertory of remedies. 'Take the ashes,' quoth Democritus, 'of the left thigh or foot, chuse you whether, incorporate the same with the milke of a sow, and therewith anoint the feet, it wil be an occasion speedily to bring the gout upon them.' Doctors differed then, as they do now, for the learned Trallianus prepared from it a most certain medicine for driving the gout away. But, however this may be, 'of the chamæleon's gall, for the most part, folk are in manner verily persuaded, that it will rid the pin and web, the cataract also of the eies, with three daies anointing; chase away serpents if it be dropped into the fire; gather all wezils in a country together, only by throwing it into the water; and fetch off haire if the body be anointed therewith.' The catalogue might be extended voluminously; but these few pre-

scriptions will suffice for those who are not anxious to penetrate into the depths of the sanitary and other mysteries of Democritus and Co.

That zoologists should have considered this form as isolated, aberrant as it appears to be from the general lacertian structure, cannot be matter of surprise. It seems to stand alone: but if we closely examine its organization, we shall find that the apparent isolation is merely a modification of different parts adapted to the wants of the animal, and that the sessile chamaeleon is as much a lizard as the nimble *Lacerta agilis*, that vanishes from the sunbeam wherein it is basking before the dazzled eye of the intruder has well made out its colours. The form of the extremities throughout the tribe is exactly fitted to the condition to which it has pleased the Great Disposer to call them, and these conditions we find gradually altered, now dwindling,* now the front pair vanishing,† then the posterior pair obliterated, with the front pair tolerably developed,‡ till, at last, the whole of the extremities disappear; and, in the innocent but much-persecuted blind-worm,§ we have a lizard in an entirely serpentine form.

Nature is inexhaustible. The wizard conquered the indefatigable demon who 'split Eildon Hills in three' in one night, by tasking him to make ropes of sea-sand. According to the usual natural instruments of progression, the task of endowing a creature with rapid motion

* *Chamaesaura*.

† *Bipes*.

‡ *Chirotes*.

§ *Anguis fragilis*. I have frequently seen this innocuous animal put to death as the most poisonous of serpents. The answer to my remonstrances has been, that I 'knew nothing about it; an adder was bad enough, but this was an *asker*, with more poison in him than all the rest put together. No one that he bites ever recovers.' This last assertion was not far from the truth; for the harmless creature never bites except what it eats—insects and worms.

on the ground, without external feet or wings, seems hardly less hopeless. Those who have seen a snake rapidly vanish among the herbage, or climb the side of a dry ditch and escape among the thorns of the hedge, will allow that the task has been most efficiently performed.

And how?

There is a great deal of geometrical neatness and nicety in the sinuous motion of snakes and other serpents, (says good Mr. Derham, canon of Windsor, and rector of Upminster, in Essex); for the assisting in which action, the annular scales under their body are very remarkable, lying cross the belly, contrary to what those in the back and the rest of the body do: also, as the edges of the foremost scales lie over the edges of their following scales; so as that when each scale is drawn back, or set a little upright by its muscle, the outer edge thereof (or foot, it may be called,) is raised also a little from the body, to lay hold on the earth, and so promote and facilitate the serpent's motion. This is what may be easily seen in the slough of the belly of the serpent kind. But there is another admirable piece of mechanism, that my antipathy to those animals hath prevented my prying into; and that is, that every scale hath a distinct muscle, one end of which is tacked to the middle of its scale; the other, to the upper edge of its following scale. This, Dr. Tyson found in the rattle-snake, and I doubt not is in the whole tribe.

Certainly; and Tyson and others, who either had not the Rev. W. Derham's antipathy or conquered it, did not stop at externals, but went a little deeper into the matter.

Blasius remarks that the knots of the vertebræ of the viper are shorter towards the head, and hence that reptile can easily bend itself both backwards and sideways. Tyson observes, in his *Anatomy of the Rattlesnake*, when treating of the vertebræ and the other curious articulations, that the round ball in the lower part of the upper vertebræ enters a socket of the upper part of the lower vertebræ, 'like as the head of the *os femoris* doth the acetabulum of the *os ischii*,—by which contrivance, as also the articulation with one another, they have that free motion of winding their bodies any way.'

In the skeleton of the largest python in the museum of the Royal College of Surgeons of England, which measures sixteen feet six inches in length, there are three hundred and forty-eight vertebræ. Of these, two hundred and seventy-nine support free or moveable ribs, the rest are caudal vertebræ. When the serpent begins to advance, the ribs of the opposite sides are drawn apart from each other, and the small cartilages at the end of them are bent upon the upper surfaces of the abdominal scuta, on which the ends of the ribs rest. The ribs move in pairs, and the scute under each pair is necessarily carried along with it. The scute lays hold of the ground by its posterior edge, and becomes a fixed point for renewed progression. Sir Everard Home, who gives this description of the serpent's motion, remarks that it is beautifully seen in climbing over an angle to get upon a flat surface; and so it is. Nor will the observer find many species, not even excepting the pythons and boas, in which it is very well seen, where this subcuticular multipedous mode of going through the world is more visibly manifested than in the puff adders.* But Sir Everard justly says, that the large abdominal scuta of the boa may be considered as hoofs or shoes, best fitted for this kind of progressive motion.

Sir Everard further shows, that there are five sets of muscles which bring the ribs forward. One set goes from the transverse process of each vertebra to the rib immediately behind it, which rib is attached to the next vertebra. The next set starts from the rib a little way from the spine, just where the former terminates, passes over two ribs, sending a slip to each, and is inserted into the third: a slip also connects it with the next succeeding muscle. Under this comes the third set, arising from the posterior side of each rib, and passes over two ribs,

* *Clotho arietans.*

sending a lateral slip to the next muscle, being inserted into the third rib behind it. The fourth set passes from one rib over the next. The fifth set goes from rib to rib.

Within, the apparatus is not less beautifully adjusted. On the inside of the chest a strong set of muscles is attached to the anterior surface of each vertebra, and passes obliquely forwards over four ribs, to be inserted nearly in the middle of the fifth. Then comes from each rib a strong flat muscle, advancing on each side before the viscera, to form the abdominal muscles, and unites in a middle tendon. Thus, the lower half of each rib, which is beyond the origin of this muscle, and only laterally connected to it by loose cellular membrane, is external to the belly of the animal, and is employed for the purpose of progression; while the half of each rib next the spine, as far as the lungs extend, is made ancillary to respiration. At the termination of each rib is a small cartilage, corresponding in shape to the rib, and tapering to the point. The cartilages of the opposite ribs are not connected, so that when the ribs are drawn outwards by the muscles, they are separated, and rest their whole length on the inner surface of the abdominal scutes, to which they are connected by a set of short muscles, and they have also a connexion with the cartilages of the neighbouring ribs by means of a set of short straight muscles.

Endowed with this apparatus, the serpent, when moving, is altered in shape, from a circular or oval form to one approaching a triangular figure, the surface on the ground forming the base.

But before Sir Everard entered into this inquiry, Sir Joseph Banks, with that instinctive acuteness which belonged to him, had remarked, as he watched a snake moving briskly along the carpet, that he thought he saw the ribs come forward, in succession, like the feet of a

caterpillar. This remark led Sir Everard to examine the reptile's motion with more attention. He put his hand under the serpent's belly, and while the snake was in the act of passing over his palm, he distinctly felt the ends of the ribs pressing upon it, in regular succession, so as to leave no doubt on his mind that the ribs, forming so many pairs of levers, were the instruments by which the animal moved its body from place to place.

Those who have crippled a common snake or a viper with a blow of a stick have seen how easily this beautiful machinery may be mutilated and rendered useless. When his nurse, by way of preventing her charge from straying into a copse, told him that snakes were there, the young Lion of the North said, 'Then give me a switch, that I may go in and kill them all.' The larger and constricting serpents are protected by the great mass of muscle from dislocation or injury of the spine by such a sudden stroke, but even they are compelled to relax their folds by a superior force.

As Mr. Gordon Cumming was examining the spoor of the game by a South African fountain, he suddenly detected an enormous old rock-snake stealing in beneath a mass of rock beside him, not quite so large, perhaps, as that exhibited in the time of Augustus at Rome, and which Suetonius tells us was fifty cubits in length; but still a serpent of very formidable dimensions.

He was (says the hunter) truly an enormous snake; and having never before dealt with this species of game, I did not exactly know how to set about capturing him. Being very anxious to preserve his skin entire, and not wishing to have recourse to my rifle, I cut a stout and tough stick, about eight feet long, and having lightened myself of my shooting-belt, I commenced the attack. Seizing him by the tail, I tried to get him out of his place of refuge; but I hauled in vain. He only drew his large folds firmer together; I could not move him. At length I got a rheim round one of his folds, about the middle of his body, and Kleinboy and I commenced hauling away in good earnest. The snake, finding the ground too hot for him, relaxed his coils, and

suddenly bringing round his head to the front, he sprang out at us like an arrow, with his immense and hideous mouth opened to its largest dimensions, and before I could get out of his way, he was clean out of his hole, and made a second spring, throwing himself forward about eight or ten feet, and snapping his horrid fangs within a foot of my naked legs.

Very fortunate for Mr. Cumming it was that the serpent did not succeed in fastening on him: if it had done so, he would most undoubtedly have been encircled in its deadly embrace. Once within the constricting folds, Kleinboy would hardly have succeeded in extricating him alive, and we might never have seen one of the most stirring books published of late years. Our Nimrod, however, sprang out of his way, and getting hold of the green bough he had cut, he returned to the charge:—

The snake now glided along at top speed: he knew the ground well, and was making for a mass of broken rocks, where he would have been beyond my reach, but before he could gain this place of refuge I caught him two or three tremendous whacks on the head. He, however, held on, and gained a pool of muddy water, which he was rapidly crossing when I again belaboured him, and at length reduced his pace to a stand. We then hanged him by the neck to a bough of a tree, and in about fifteen minutes he seemed dead, *but he again became very troublesome during the operation of skinning, twisting his body in all manner of ways.* This serpent measured fourteen feet.

There is no amount of torture that man—ay, and woman too, will not inflict on an animal that does not cry out. If the eels, which the fish-wife or the cook skins with so much unconcern, could express their agonies audibly, nothing would induce either of those delicate females to continue the horrible and merciless operation; but the eels are mute, and suffer accordingly.

Two works of art, ancient and modern, rise before us: one in all the simplicity and purity of marble; the other glowing with all the enchantment of colour. In the one, the agonized priest of Apollo and his hapless children vainly struggle in the folds of the serpents:—

Laocöonta petunt : et primum parva duorum
 Corpora natorum serpens amplexus uterque
 Implicat, et miseros morsu depascitur artus.
 Post ipsum auxilio subeuntem ac tela ferentem
 Corripiunt, spirisque ligant ingentibus ; et jam
 Bis medium amplexi, bis collo squamea circum
 Terga dati superant capite et cervicibus altis.
 Ille simul manibus tendit divellere nodos,
 Perfusos sanie vittas atroque veneno ;
 Clamores simul horrendos ad sidera tollit.

In that marvellous group,

All made out of the carver's brain,
 the serpents are so represented, that the spectator feels
 that there is no hope for the victims. The very oppo-
 site to this appears in the subject made musical by the
 exquisite Doric reed of Theocritus, and brought in all its
 grandeur before the eye by the bold and beautiful pencil
 of our own Reynolds.

In the idyll of the Greek,* opening with one of the
 most charming maternal scenes and good nights ever
 presented to the imagination, the serpents are made to
 relax their folds *when the spines of their backs* waxed
 weary under the killing grasp of the Infant Hercules ;
 and in the British picture you see at once that they are
 dying, overcome by the vigour of the son of Jupiter.

But as long as the locomotive machinery is in good
 order, the sinuous, graceful windings of the serpent,
 joined to the bright hues with which the skin of the
 majority of the species is enamelled, make it a pleasing
 object to those who can overcome the natural antipathy
 felt by so many at their presence, and incline them to
 sympathize with the Indian girl,—

Stay, stay, thou lovely, fearful snake,
 Nor hide thee in yon darksome brake ;
 But let me oft thy form review,
 Thy sparkling eyes and golden hue :

* Ηρακλισκος. Εἰδύλλιον κδ'.
 Ηρακλῆα δεκάμηνον ἑόντα.—κ. τ. λ.

From thence a chaplet shall be wove
 To grace the youth I dearest love.
 Then, ages hence, when thou no more
 Shalt glide along the sunny shore,
 Thy copied beauties shall be seen ;
 Thy vermeil red and living green
 In mimic folds thou shalt display :
 Stay, lovely, fearful adder, stay !

To be sure, poets as well as doctors differ ; and Coleridge, in 'that singularly wild and beautiful poem,' tells us that

A snake's small eye blinks dull and sly.

And dull it is sometimes, but only before moulting, for the skin of the cornea comes off with the rest of the slough. When the serpent comes out in his new coat, with its bright eye and elegant action, it is as different from its former self as Talleyrand in solitary dishabille was from Talleyrand dressed in a brilliant assembly, through whose crowded mazes he would wind his way, his very lameness lending grace to his gently undulating progress.

Those who define a serpent as an apod, or footless animal, carry their definition too far. The large constricting serpents, and not only those but *eryx* and *tortrix*, are furnished with the rudiments of hinder extremities, which appear to have escaped the notice of Sir Everard Home, but did not escape that of Dr. Mayer. Observing the spur, or nail, on each side of the vent in the *boïdæ*, the Doctor examined further, and found it to be a true nail, in the cavity of which is a little semi-cartilaginous bone, or ungual phalanx, articulated with another much better developed bone, which is concealed under the skin. This second bone of the rudimentary foot presented an external thick condyle, with which the ungual phalanx was articulated, and was furnished besides with a smaller internal apophysis. Proceeding in his investigation, he laid bare a rudimentary tibia, with its muscles, and made out a complete posterior limb, such

as it was, the foot being furnished with its adductor and abductor muscles. Upon these elements he founded his *Phænopoda*, a family of Ophidians, having the rudiments of a foot visible externally, containing the genera *boa*, *python*, *eryx*, and *tortrix*.

In the article 'Boa,' in the *Penny Cyclopædia*, where the details of this curious discovery are given, I have observed, that no one can read of the habits of these reptiles in a state of nature without perceiving the advantage which they gain, when, holding on by their tails on a tree, their heads and bodies in ambush, and half floating on some sedgy river, they surprise the thirsty animal that seeks the stream. These hooks help the serpent to maintain a fixed point: they become a fulcrum, which gives a double power to his energies.

We need not go to the Valley of Diamonds with Sinbad to find enormous serpents. The companions of other sailors have been swallowed up by those monstrous reptiles, as was too clearly proved to the crew of the Malay proa, who anchored for the night close to the island of Celebes. One of the party went on shore to look for betel-nut, and, on returning from his search, stretched his weary limbs to rest on the beach, where he fell asleep, as his companions believed. They were roused in the middle of the night by his screams, and hurried on shore to his assistance. But they came too late. A monstrous snake had crushed him to death. All they could do was to wreak their vengeance on his destroyer, whose head they cut off, and bore it with the body of their shipmate to their vessel. The marks of the teeth of the serpent, which was about thirty feet in length, were impressed on the dead man's right wrist, and the disfigured corpse showed that it had been crushed by constriction round the head, neck, breast, and thigh. When the snake's jaws were extended, they admitted a body the size of a man's head.

By great Apollo's arm the python slain,
O'er many a rood lay stretch'd upon the plain.

Latona's son did his work with the graceful ease of a divinity—oh, that the work of Leontius* had been spared to us!—but the mortals who were opposed by the enormous python near Utica had a very different task to perform:—

Well knowne it is that Attilius Regulus, generall under the Romans during the wars against the Carthaginians, assailed a serpent near the river Bagrada,† which carried in length 120 foot; and before he could conquer him was driven to discharge upon him arrows, quarrels, stones, bullets, and suchlike shot, out of brakes, slings, and other engins of artillery, as if he had given the assault to some strong warlike towne; the prooffe whereof was to be seen by the marks remaining in his skin and chawes, which, until the war of Numantia, remained in a temple or conspicuous place of Rome.

But, though vanquished, the monster had his revenge; for his huge carrion and corrupt gore so polluted the air and waters that his conquerors were obliged to move their camp, not, however, without taking his skin with them as *spolia opima*. General Peter Both made a better thing of it with a great Indian python, for he and his friends feasted on a magnificent wild boar, which the enemy had pouched just before its defeat and death.‡

* This 'famous imageur,' as Philemon Holland calls him, who 'expressed lively in brasse,' executed, among other bronzes, 'one Apollo playing upon his harpe; as also another Apollo, and the serpent killed with his arrowes, which image he surnamed Dicæus, i. e. just: for that when the city of Thebes was won by Alexander the Great, the gold which he hid in the bosome thereof when hee fled, was found there safe and not diminished, when the enemy was gone and he returned.'

† Some write 'Bagradas' and 'Magradas' (Mejerda).

‡ Bontius. Regulus was not the only great captain who had to encounter other than human enemies. It was, no doubt, very smart to say,

Philip fought men, but Alexander women—

The African or Asiatic pythons may have been in the eye of the sculptor of the Laocoön, but the models may have existed nearer home, 'for that we see in Italy other serpents named boæ, so big and huge, that in the daies of the Emperor Claudius, there was one of them killed in the Vaticane, within the belly whereof there was

whatever injustice there may have been in a sarcasm so dearly paid for; but, without standing up for the bravery of the men he conquered on their own soil—men who fought valiantly *pro aris et focis*,—Philip's son, according to Vincentius, was sorely beset by monsters as well as men. To say nothing of the 'hippodami,' which rushed upon and devoured his troops as they were passing the Indian river, when, in indignation at those who had led his Macedonians into such peril without proper precautions, he ordered a hundred and fifty of his generals to be thrown into the stream, where the hippodami aforesaid did execution upon them,—*justa pœna affecerunt*,—to say nothing of that episode, his soldiers had other horrors to confront. His camp was pitched near a lake, and the weary Greeks were reposing after the heavy fatigues of the day, when, at the rising of the moon, down came an army of scorpions for their accustomed night-draught. They were followed by a host of cerastes and other serpents, of all sizes and colours, some red, some black, some white, and others glittering like gold. The whole country resounded with their hissings. The affrighted soldiers threw themselves instinctively into the serried phalanx, and with their spears and shields crushed and pierced the invaders, and the light troops plied them with fire. After a fight of about two hours, some of the reptiles were killed, some got their drink, and the survivors, to the joy of the troops, departed to their hiding-places. Then, up to the third hour of the night, the garrison had a little rest, when down came immense serpents, as long and as big as columns, with two or three heads a-piece. With these the Macedonians fought for more than an hour—not by Shrewsbury clock—and routed them, but not without the loss of thirty slaves and twenty soldiers. After the departure of the serpents appeared enormous crabs, with shells like crocodiles. Many of these were burnt, but many fought their way into the lake. The harassed troops now began to hope that their troubles were, for the present, ended, when down came white lions as big as bulls, great boars, lynxes, tigers, and horrible panthers; and as soon as they were driven off, an army of bats as big as pigeons was about their ears :

found an infant all whole.* Europe is separated from Africa by no very wide gulf,—

It is a narrow strait,

You may see the blue hills over;

and the character of some of the vegetation of the south reminds the observer of that of Africa.

But to see the true bœ in their native forests we must cross the Atlantic; and those who are not familiar with the story may have no objection to learn how Captain Stedman fared in an encounter with one twenty-two feet and some inches in length, during his residence in Surinam.

Captain Stedman was lying in his hammock, as his vessel floated down the river, when the sentinel told him that he had seen and challenged something black moving in the brushwood on the beach, which gave no answer. Up rose the captain, manned the canoe that accompanied his vessel, and rowed to the shore to ascertain what it was. One of his slaves cried out that it was no negro, but a great snake, that the captain might shoot if he pleased. The captain having no such inclination, ordered all hands to return on board. The slave, David, who had first challenged the snake, then begged leave to step forward

but, above all, there came a beast bigger than an elephant, black, with a head like a horse, and its forehead armed with three horns, called by the Indians 'odonta.' This odonta, having drunk at the lake, espied the camp, and immediately charged it, notwithstanding the fires. In this last encounter six-and-thirty soldiers were slain, and fifty-three faulchions rendered useless. At length the monster died, transfixd by spears. While the men were thus employed, the quadrupeds were attacked and killed by an army of Indian rats. Those who would see what the hippodami were like, as well as the scorpions, serpents, crabs (which, by the way, have the form of lobsters or crayfish), white lions, panthers, bats, and, above all, the odonta that figured in this night attack, let them turn to the delectable woodcuts in the *Prodigiorum ac Ostentorum Chronicon*,—Basileæ, 1557.

* Holland's Pliny.

and shoot it. This seems to have roused the captain, for he determined to kill it himself, and loaded with ball cartridge.

The master and slave then proceeded. David cut a path with a bill-hook, and behind him came a marine with three more loaded guns. They had not gone above twenty yards through mud and water, the negro looking every way with uncommon vivacity, when he suddenly called out, 'Me see snakee !' and, sure enough, there the reptile lay, coiled up under the fallen leaves and rubbish of the trees. So well covered was it that some time elapsed before the captain could perceive its head, not above sixteen feet from him, moving its forked tongue, while its vividly bright eyes appeared to emit sparks of fire. The captain now rested his piece upon a branch to secure a surer aim, and fired. The ball missed the head, but went through the body, when the snake struck round with such astonishing force, as to cut away all the underwood around it with the facility of a scythe mowing grass, and flouncing with its tail, made the mud and dirt fly over their heads to a considerable distance. This commotion seems to have sent the party to the right about ; for they took to their heels and crowded into the canoe. David, however, entreated the captain to renew the charge, assuring him that the snake would be quiet in a few minutes, and that it was neither able nor inclined to pursue them, supporting his opinion by walking before the captain till the latter should be ready to fire.

They now found the snake a little removed from its former station, very quiet, with its head as before, lying out among the fallen leaves, rotten bark, and old moss. Stedman fired at it immediately, but with no better success than at first ; and the enraged animal, being but slightly wounded by the second shot, sent up such a cloud of dust and dirt as the captain had never seen,

except in a whirlwind ; and away they all again retreated to their canoe. Tired of the exploit, Stedman gave orders to row towards the barge ; but the persevering David, still entreating that *he* might be permitted to kill the reptile, the captain determined to make a third and last attempt in his company ; and they this time directed their fire with such effect, that the snake was shot by one of them through the head.

The vanquished monster was then secured by a running noose passed over its head, not without some difficulty, however ; for though it was mortally wounded, it continued to writhe and twist about so as to render a near approach dangerous. The serpent was dragged to the shore, and made fast to the canoe, in order that it might be towed to the vessel, and continued swimming like an eel till the party arrived on board, where it was finally determined that the snake should be again taken on shore, and there skinned for the sake of its oil. This was accordingly done ; and David, having climbed a tree with the end of a rope in his hand, let it down over a strong forked bough, the other negroes hoisted away, and the serpent was suspended from the tree. Then David, quitting the tree, with a sharp knife between his teeth, clung fast upon the suspended snake, still twisting and twining, and proceeded to perform the same operation that Marsyas underwent, only that David commenced his work by ripping the subject up : he then stripped down the skin as he descended. Stedman acknowledges, that though he perceived that the snake was no longer able to do the operator any harm, he could not, without emotion, see a naked man, black and bloody, clinging with arms and legs round the slimy and yet living monster. The skin and above four gallons of clarified fat, or rather oil, were the spoils secured on this occasion ; full as many gallons more seem to have been wasted. The negroes cut the flesh into pieces, intending to feast

on it; but the captain would not permit them to eat what he regarded as disgusting food, though they declared that it was exceedingly good and wholesome. The negroes were right and the captain was wrong: the flesh of most serpents is very good and nourishing, to say nothing of the restorative qualities attributed to it, and noticed in a former paper.

One of the most curious accounts of the benefit derived by man from the serpent race, is related by Kircher (see *Mus. Worm.*), where it is stated that near the village of Sassa, about eight miles from the city of Bracciano, in Italy, there is a hole or cavern called *la Grotta delli Serpi*, which is large enough to contain two men, and is all perforated with small holes like a sieve. From these holes, in the beginning of spring, issue a prodigious number of small, different coloured serpents, of which every year produces a new brood, but which seem to have no poisonous quality. Such persons as are afflicted with scurvy, leprosy, palsy, gout, and other ills to which flesh is heir, were laid down naked in the cavern, and their bodies being subjected to a copious sweat from the heat of the subterraneous vapours, the young serpents were said to fasten themselves on every part, and extract by sucking every diseased or vitiated humour; so that after some repetitions of this treatment, the patients were restored to perfect health. Kircher, who visited this cave, found it warm, and answering in every way the description he had of it. He saw the holes, heard a murmuring hissing noise in them, and though he owns that he missed seeing the serpents, it not being the season of their creeping out, yet he saw great numbers of their exuviae or sloughs, and an elm growing hard by laden with them. The discovery of this air-Schlangenbad was said to have been made by a leper going from Rome to some baths near this place, who, fortunately, losing his way, and being benighted, turned into this cave. Finding it very

warm, and being very weary, he pulled off his clothes, and fell into such a deep sleep that he did not feel the serpents about him till they had wrought his cure.

Such instances of good-will towards man, combined with the periodical renovation of youthful appearance, by a change of the whole external skin, and the character of the serpent for wisdom, contributed, doubtless, to raise the form to a place among the deities.

We may not forget that *Genii* were sometimes paynted by the Paynims in the forme and shape of man, having a horne, betokening plentie or abundance in their hand: as is yet to be seene in many olde and auncient stamper or coynes; and sometimes in the forme of serpents: which may well serve to understand that verse of Persius,—

Pinge duos angues, pueri, sacer est locus, &c.

And this did not Servius forget, speaking of that serpent which Æneas (in his anniversaries, or yearly sacrifices, celebrated to the name of his father Anchises) did see to creepe upon his tombe: touching the which (as Virgill saith) Æneas was uncertaine, whether it were the *Genius* of his father or of the place. And this may also helpe to the interpretation of another place in Theocritus, in his booke of *Characters* (which I have also corrected from the vulgar and common reading), where he saith, that a superstitious person, seeing by chaunce a serpent in his house, did consecrate unto it a little chappell in the same place. But my meaning is not here to speake of serpents, which (as Plutarch saith) were consecrated unto noble and heroicall persons, and which after their deaths, did appeare neere to their corpses: for this is not any part of our matter; albeit a man may very well fit, unto the *Genii*, that same which he hath delivered touching this point.*

Fond of milk and wine, these *genii*, like the *lubricus anguis* of Virgil's fifth book, tasted the libations and were regarded as sacred. Their aptitude for tameness was another quality which aided their elevation. The little girl mentioned by Maria Edgeworth, of blessed memory,

* *A Treatise of Spectres or Straunge Sights, Visions, and Apparitions appearing sensibly unto Men.* At London. Printed by Val. S. for Matthew Lownes, 1605.

took out her little porringer daily to share her breakfast with a friendly snake, that came from its hiding-place to her call ; and when the guest intruded beyond the due limits, she would give it a tap on the head with her spoon, and the admonition, 'Eat on your own side, I say.'

A lad whom I knew kept a common snake in London, which he had rendered so tame that it was quite at ease with him, and very fond of its master. When taken out of its box, it would creep up his sleeve, come out at the top, wind itself caressingly about his neck and face, and when tired retire to sleep in his bosom.

Carver, in his travels, relates an instance of docility, which, if true, surpasses any story of the kind I ever heard.

An Indian belonging to the Menomonie, having taken a rattle-snake, found means to tame it ; and when he had done this treated it as a deity, calling it his great father, and carrying it with him in a box wherever he went. This he had done for several summers, when Mons. Pinnisance accidentally met with him at this carrying place, just as he was setting off for a winter's hunt. The French gentleman was surprised one day to see the Indian place the box which contained his god on the ground, and opening the door give him his liberty ; telling him, whilst he did it, to be sure and return by the time he himself should come back, which was to be in the month of May following. As this was but October, Monsieur told the Indian, whose simplicity astonished him, that he fancied he might wait long enough, when May arrived, for the arrival of his great father. The Indian was so confident of his creature's obedience, that he offered to lay the Frenchman a wager of two gallons of rum, that at the time appointed he would come and crawl into his box. This was agreed on, and the second week in May following fixed for the determination of the wager. At that period they both met there again, when the Indian set down his box, and called for his great father. The snake heard him not ; and the time being now expired, he acknowledged that he had lost. However, without seeming to be discouraged, he offered to double the bet if his father came not within two days more. This was farther agreed on ; when, behold, on the second day, about one o'clock, the snake arrived, and of his own accord crawled into

the box, which was placed ready for him. The French gentleman vouched for the truth of this story, and from the accounts I have often received of the docility of those creatures, I see no reason to doubt its veracity.

Southey has taken advantage of this docility, when he brings before us the diabolical arch-priest, and his monstrous god :—

The general grave
Was delved within a deep and shady dell,
Fronting a cavern in the rock, . . . the scene
Of many a bloody rite, ere Madoc came . . .
A temple as they deemed by Nature made,
Where the snake-idol stood.

Suddenly Neolin
Sprung up aloft, and shrieked, as one who treads
Upon a viper in his heedless path.
The God! the very God! he cried, and howled
One long, shrill, piercing modulated cry,
Whereat from that dark temple issued forth
A serpent huge and hideous. On he came
Straight to the sound, and curl'd around the priest
His mighty folds innocuous, overtopping
His human height, and arching down his head,
Sought in the hands of Neolin for food;
Then questing, rear'd and stretch'd and waved his neck,
And glanced his forked tongue. Who then had seen
The man, with what triumphant fearlessness,
Arms, thighs, and neck, and body wreathed and ring'd
In those tremendous folds, he stood secure,
Play'd with the reptile's jaws, and call'd for food,
Food for the present God! . . . who then had seen
The fiendish joy, which fired his countenance,
Might well have ween'd that he had summoned up
The dreadful monster from its native Hell
By devilish power, himself a fiend inflesh'd.

Making every allowance for the exaggerations of the Spaniards, idolatry in general and snake-worship in particular must have been manifested in the country of Neolin in all its hideousness.

Bernal Diaz * declares that

* Bernard Diaz del Castillo.

The head of a sacrificed person was strung up; the limbs eaten at the feast; the body given to the wild beasts which were kept within the temple circuits; moreover, in that accursed house they kept vipers and venomous snakes who had something at their tails which sounded like morris-bells, and they are the worst of all vipers; these were kept in cradles, and barrels, and earthen vessels, upon feathers, and there they laid their eggs, and nursed up their snakelings, and they were fed with the bodies of the sacrificed, and with dog's flesh. We learnt for certain, that, after they had driven us from Mexico, and slain above 850 of our soldiers and of the men of Narvaez, these beasts and snakes, who had been offered to their cruel idol to be in his company, were supported upon their flesh for many days. When these lions and tygers roared, and the jackals and foxes howled, and the snakes hissed, it was a grim thing to hear them, and it seemed like hell.

'Mexico,' says Mr. Bullock, 'still possesses many objects of study for the antiquarian;' and he goes on to tell us that sculptured idols are to be found in various parts of the city. The corner-stone of the building occupied by the lottery-office when he was there, and fronting the market for shoes, was the head of the serpent-idol, of great magnitude: in his judgment, it was not less than seventy feet in length when entire. Under the gateway of the house nearly opposite the entrance to the mint was a fine statue of a deity, having the human form in a recumbent posture, about the size of life. This was found in digging a well. The house at the corner of a street, at the south-east side of the great square, was built upon, and in part supported by, a fine circular altar of black basalt, ornamented with the tail and claws of a gigantic reptile. In the cloisters behind the Dominican convent was a noble specimen of the great serpent-idol, almost perfect, and of fine workmanship, represented in the act of swallowing a human victim, which is crushed and struggling in its horrid jaws.

The sacrificial stone, or altar, is buried in the square of the cathedral, within a hundred yards of the calendar stone.* The

* Popularly called Montezuma's watch.

upper surface only is exposed to view, which seems to have been done designedly, to impress upon the populace an abhorrence of the horrible and sanguinary rites that had once been performed on this very altar. It is said by writers that 30,000 human victims were sacrificed at the coronation of Montezuma. Kirwan, in the preface to his *Metaphysics*, states the annual number of human victims immolated in Mexico to be 25,000. I have seen the Indians themselves throw stones at it; and I once saw a boy jump upon it, clench his fist, stamp with his foot, and use other gesticulations of the greatest abhorrence. As I had been informed that the sides were covered with historical sculpture, I applied to the clergy for the farther permission of having the earth removed from around it, which they not only granted, but, moreover, had it performed at their own expense. I took casts of the whole. It is twenty-five feet in circumference, and consists of fifteen various groups of figures, representing the conquests of the warriors of Mexico over different cities, the names of which are written over them.

But the largest and most celebrated of the Mexican deities was known to be buried under the gallery of the university. It was liberally disinterred at the expense of the university in a few hours; and Mr. Bullock had the pleasure of seeing the resurrection of this horrible deity, before whom tens of thousands of human victims had been sacrificed.

It is scarcely possible (observes our author) for the most ingenious artist to have conceived a statue better adapted to the intended purpose; and the united talents and imagination of Brughel and Fuseli would in vain have attempted to improve it.

The idol was hewn out of one solid block of basalt, nine feet high, its outlines giving an idea of a deformed human figure, uniting all that is horrible in the tiger and rattle-snake.

Instead of arms it is supplied with two large serpents, and its drapery is composed of wreathed snakes, interwoven in the most disgusting manner, and the sides terminating in the wings of a vulture. Its feet are those of the tiger, with claws extended in the act of seizing its prey, and between them lies the head of another rattle-snake, which seems descending from the body of the idol. Its decorations accord with its horrid form, having a large

necklace composed of human hearts, hands, and skulls, and fastened together by the entrails. It has evidently been painted in natural colours, which must have added greatly to the terrible effect it was intended to inspire in its votaries.

If that grim stone could have spoken, what agonizing scenes it might have described:—

The heart still panting was taken by the priest from the breast, and deemed the more acceptable to the deity if it smoked with life; and the mangled limbs of the victim were then divided amongst the crowd as a feast worthy of the goddess. In the night of desolation, called by the Spaniards *Noche Triste*, in which many were made prisoners by the Mexicans, the adventurous Cortez, and his few remaining companions in arms, were horror-stricken by witnessing the cruel manner in which their captive fellow-adventurers were dragged to the sacrificial stone, and their hearts, yet warm with vitality, presented by the priests to the gods; and the more the separated seat of life teemed with animation, the more welcome was the offering to the goddess,—the more heartrending the cries of the victims, the more grateful the sacrifice to this monster representative of deformity and carnage.*

February, 1851.

* *Six Months in Mexico.* Those who saw, as I did, the cast of this infernal deity in Mr. Bullock's Exhibition, in 1824, will acknowledge that his description is not overcharged.

CHAPTER XIV.

EVENTS come round in cycles. In 1750, the winter was as mild as that which has just passed, and the spring very early. In Sweden, the 'steel nights,' which are generally felt in all their rigour somewhere about the last week in February, were so entirely absent, that lands were sown in Upland in that week; the usual time for sowing in Sweden seldom arriving before April. Harald Barck, who records this unusual mildness and its consequences, adds, that he is not ignorant that the lands in some of the northern provinces, especially those which abound in clay, require early sowing, that the ground may be broken with less trouble, and that the first shoots of the barley may make their way through it before it grows stiff. He adds, that the people of Schonen, and others that dwell near the sea, sow late, whether the spring be early or not; and that sometimes to their great loss, for no other reason, than that they received this custom from their ancestors. The most northern inhabitants of Sweden find it necessary to sow as soon as the frost breaks up, that the short summer may perfectly ripen the grain before the winter approaches. For as eggs require a fixed time for the exclusion of the young, so the barley does in different provinces to ripen the seed.* Harald then gives a table of the times of sowing in different localities, in different years, the latest time being the 18th of June, and the earliest the 16th of April. He concludes from these observations, that the sowing of barley nearly coincides with the foliation of the

* *Amen. Acad.*

birch, at least in Upland, and other places adjacent. He remarks, that it is a popular error, that less time passes between the sowing and ripening of wheat in their northern provinces than at Upsal, and that this happens, because the summer days are longer in the north, and there is scarcely any night to retard its growth. But this error is made evident by the grain ripening in as short a time in Schonen as in Lapland; for barley, in the champain part of Schonen, is sown about the 29th of May, and reaped sooner than in Upland. But why barley ripens later in Upland and Wessmania than in the other provinces of Sweden, he confesses to be an absolute secret to him.*

With us, though Aquarius has been predominant, there has been hardly any freezing—none of any consequence—though, so late as the 12th of February, I saw ice on the water in St. James's Park, as if Jack Frost was determined to show that his power was not utterly extinct. But the yellow aconite and primroses were in bloom early in January; and on the 10th of that month, baskets full of them were exposed for sale in Covent Garden Market. On the 12th, posies of wallflowers, polyanthuses, and garden anemones, were hawked about the streets; and on the 19th, wallflowers, with some of the blossoms expanded, which had been dug up for planting in the suburbs, and in the broken pan of the artisan, to remind him that there is such a place as the country, which he is beginning to forget, were pitched there in full panniers. On the 11th and 12th of February, crocuses were to be seen expanding their golden chalices in some of the miniature London gardens—gardens which, as the late Lord Canterbury said of poor dear Theodore Hook's, at Fulham, look as if they might be kept in order with a pair of scissors and a tooth-pick; but I saw those welcome


* *Amæn. Acad.*

heralds of spring, decked with their glowing tabards, as early as the 2nd of that month some few years since.

The Frost-genius takes his opportunities of convincing mortals that his reign has not passed away, by a demonstration of more than ordinary severity, as he did in 1783-4, when Paris especially was frozen to her very marrow, and the greatest distress prevailed; nor did the thaw permanently take place till late in February. Louis XVI. and Marie Antoinette put forth all their benevolent powers to relieve the pinching misery of that icy grasp, and the blessings of the people were inscribed on obelisks of snow—as durable as their gratitude.

19th January.—A genial afternoon, with a good spice of an *old* May day in it, led me to the Zoological Gardens, where a tapir was lounging about in the open air, as comfortable apparently as if it had been in South America. Hippo very much grown, and thriving admirably. His food still oatmeal and milk, and it must be told—as the well-bred Hamet informed me in a whisper—‘many horse-dung,’ of which latter condiment he consumes a great deal, and has long done so. This reminded me of a passage in Sparrman, in which he anticipates the possibility of bringing one of these animals to Europe. Speaking of the sucking hippopotamus which he captured and dissected, the Swedish doctor says, ‘I am apt to suppose that one a little older than this would not be very nice in its food; as that which we caught was induced by hunger, as soon as it was let loose near the waggon, to put up with something not extremely delicate, which had been just dropped from one of our oxen.’

It is not at all improbable that the animal took this, not from pressure of hunger, but as a corrective to the milk, the curd of which was found in its stomach; and it is possible that the sucking hippopotamus, in a state of nature, may have recourse to the droppings of the parent for that purpose. This does not seem to have occurred



to Sparrman, who, after relating his anecdote, observes, that this may appear very extraordinary in an animal with four stomachs; but that there have been instances of this kind known in common cattle, which in Herjedal, are partly fed with horse-dung. He states that he has been assured that this method of feeding cattle has been practised with great advantage in Upland when there has been a scarcity of fodder; and that afterwards these same cattle, even when they have not been in want of proper fodder, have taken to this food of their own accord, and have eaten it without anything else being mixed with it.

The regimen has agreed with our Hippo wonderfully. No animal could be in better health. He was thoroughly enjoying existence in his bath, wherein he spends more time as he grows older. The teeth are just come through, and he seemed to take pleasure in champing Professor Owen's stick when held near its mouth, as a child would use a coral. When he rises after his submersion, he shakes the water from his ears with a brisk motion: this he invariably does when he emerges. The overlapping of the huge upper lip stands him in good stead when he wishes to expel the water from his mouth. He drives it backwards with considerable force, and the water rushes from under the overlap, as if from a gigantic pair of gills. When, in its natural state, the animal feeds upon water-plants, scooped up by its enormous teeth, these sluices must be very convenient for getting rid of the mud and water.

The great tortoise had buried its head in the sand in the ostrich-house up to the shoulders; but the greater portion of the shell and the lower extremities were exposed. I *hope* it may be alive, but I have my misgivings. Not one of the large tortoises that I recollect have survived. Yet White's old tortoise retired annually under his bunch of hepaticas, and lay snug in the ground open to every skiey influence, till rejoicing nature bade

winter farewell. A smaller one rested its head upon the sand, but had not buried itself at all.

I suspect that we do not know how to manage these creatures, which perish in consequence of the artificial life they lead. The hybernation is incomplete,—and this intermediate state, this life in death, neither one thing nor the other. The animal consequently loses its balance and dies.

So! the Polar Bear has escaped a *vinculo matri-monii*, and remains in his bachelor's den on a separate maintenance. I thought how it would be. They led a regular cat and dog life; she, growling and snapping whenever he came near her, and he looking and acting like a thorough Jerry Sneak, and giving unmistakeable evidence of his anxiety to get out of such company, by rearing himself up against the walls of his prison, and examining every part of it—not without effect. For, some days since, he scaled the smooth wall of the yard, and notwithstanding the inverted cheval-de-frise with which it was fortified, got clear of his prison and his termagant wife at once. He was discovered, early one morning, near the dromedary-house, by a blacksmith who had come to his work.

The blacksmith looked at the white bear, and the white bear looked at the blacksmith, who, like a valiant and wise smith, did not run, but stood his ground and shouted; whereupon the bear retreated into a bush of laurel. Presently the bear put forth his nose as if meditating an advance, when the smith shouted again, and the bear again drew back. This amœbæan scene continued till the shouts of the man collected some of the keepers, who instantly took measures for his recapture. Bruin walked off, got upon the shed at the end of the new aviary, and descended thence into the paddock. Hereabouts, Cock-sedge,—who some years back boldly marched up to a crouching lion, of which he had the care, but which had

escaped from the old temporary Carnivora-house, near the spot where the Dromedary-house now stands, and was ogling some antelopes and deer in the adjoining close, with no amorous intentions,—came up with the bear. Him he treated differently from the lion, whom he seized by the mane, and led back to his den; but the bear, having no mane, Cocksedge tackled 'The Polar,' as he is called in some of the Fair bills, in a different way. The brave keeper advanced with a strong rope, which had a running noose, and threw it over the monster's neck; and then he pulled, and the bear pulled, till the rope broke. Bruin quietly lifted his arm, and, with his forepaw, disembarrassed himself of the noose. Cocksedge, nothing daunted, caught him with another rope, and a struggle ensued, the infuriated beast biting the rope till he got free, and walking on, followed by a detachment of keepers, who managed, by heading him at proper intervals, and showing a bold front, to keep him out of the park. While they were trying to prevent this, he made a desperate, but, luckily, ineffectual rush at one of the men. At last, by dint of marches and counter-marches, they so managed their tactics, that they drove him gradually up to the door of a den which stood invitingly open, and in he went and was secured; not, however, without dashing with all his weight and strength at the gate of his new prison. This escape led to an immediate order for caging the whole of the white bear yard overhead with iron, where Bruin is again domiciled with his partner, a reconciliation having taken place; and now, with the exception of an occasional squabble, not uncommon in such cases, they get on very well together.

But we must return to the reptile-house, and, like the witch of Ben-y-gloe, finish our snakes.*

* Those who have not had the pleasure of reading Mr. Scrope's stirring book on *Deer-stalking* had better possess themselves of it

And here I would venture to suggest an improvement in the ordering and keeping the reptiles, which must materially affect the comfort and health of the fine specimens which are there preserved. Generally speaking, reptiles, snakes especially, are very fond of water, not merely for the purpose of drinking, but of taking a bath. Most of the boas and pythons, of which there is such a fine show, haunt the neighbourhood of waters in their natural state; and in the summer months, the serpents in the reptile-house may be observed availing themselves of the scanty accommodation afforded them. On the 28th of July, in the last year, there was not a single serpent, with the exception of what may be termed the more arid species, that was not making the most of the milk-pans of water, that did duty for baths. It was at once ludicrous and painful to see the efforts of the more gigantic snakes to cool their heated systems in an allowance of fresh water, which would be considered stinted in a long voyage. The rock-snake could do no more than get its head, and no great part of its neck, into its pan, and there the head lay motionless, except when it was,

at once; and there they will find the witch surrounded by all the horrors in which M. G. Lewis, that 'jewel of a man,' as Byron called him, could envelop her. Here is a morsel or two by way of a whet:—

She heard him on her mount of stone,
Where on snakes alive she was feeding alone;
And straight her limbs she anointed all
With basilisk's blood, and viper's gall.

But seeing before away she sped,
That her snakes, half-eaten, were not yet dead,
She crush'd their heads with fiendish spite,
But had not the mercy to kill them quite.

Now, if lords and ladies are curious to know
What became of the witch when she left Ben-y-gloe,
'Tis right to inform them, for fear of mistakes,
That home she went, and finished her snakes.

ever and anon, plunged under the surface, the brandished bifid tongue proclaiming the relish with which the fevered animal, enclosed in glass, enjoyed the limited relief. Think what a magnificent sight it would be to see the Oular Sawa,* and the grand Python Sebæ, disporting in a well-filled bath of adequate dimensions. The pans do tolerably well for the smaller serpents, which show the gratification that they feel by coiling themselves up in them with nothing but their head out. One of these was thus coolly reposing while a little fish, destined for its maw, was quietly swimming about in the pan, utterly unconscious of the deadly vicinage. But any one who has observed the graceful sinuosities of our pretty ringed snake,* in crossing a pond, must feel how much is lost by depriving the spectator of a satisfactory view of the animal while obeying its natural instincts, to the gratification of both. These ringed snakes will take fish as well as frogs, but rarely, and then most probably in consequence of a scarcity of their ordinary batrachian diet. The snake generally takes the frog behind, as the latter is fleeing from its deadly enemy; and, in such cases, the frog is swallowed rump foremost, the hinder legs being protruded forwards, and sticking out in a sort of amorphous bunch with the head, as the unhappy frog is gradually swallowed alive. It is very distressing to witness this operation, rendered more painful by the shrill cries of the frog; and I have more than once liberated the agonized patient while fishing, by striking the serpent's head and neck with the point of my rod—a piece of humanity somewhat questionable, especially as I do not remember that I left off pulling out the trouts upon such occasions; but then *they* did not cry. The process of deglutition is horrible to behold, and the martyred frog descends into its living sepulchre a living thing. Mr. Bell saw a little one, which

* *Python reticulatus*.† *Natrix torquata*.

had been swallowed by a very large snake, leap out of the mouth of the latter, taking advantage of an unlucky gape of the snake after the operation was over—an action which is not uncommon with serpents immediately after they have swallowed their prey; and he heard, on another occasion, a frog distinctly utter its peculiar cry several minutes after it had been swallowed by the snake; this I can confirm. Sometimes two snakes seize upon one luckless frog at the same time—a joint seizure, which is not very likely to happen when the animals are at liberty, and in their natural state, but which passed under the eyes of Mr. Bell, the litigant parties being in imprisonment.

He tells us that, on placing a frog in a large box, in which were several snakes, one of the latter instantly seized it by one of the hinder legs; and, immediately afterwards, another of the snakes took forcible possession of the fore leg of the opposite side. Each continued its inroads upon the poor frog's limbs and body, till the upper jaws of the snakes met, and one of them slightly bit the jaw of the other; this was immediately retaliated, Mr. Bell thinks without any hostile feeling,—*quære tamen*, as the lawyers say; for, after one or two such accidents, the strongest of the snakes commenced shaking the other, which still kept its hold of the frog, with great violence, from side to side, against the sides of the box. Then the combatants rested for a few moments, when the other returned to the attack; and at length the one which had last seized the frog, having a less firm hold, was shaken off, and the conqueror swallowed the prey. Mr. Bell, who did not throw his warder down during this gentle passage of arms, then put another frog into the box, which was at once seized and swallowed by the unsuccessful combatant.*

* *British Reptiles.*

My observations agree with those of Mr. Bell in cases where the snake seizes the frog by the middle of the body. The serpent then turns the frog, and swallows it head foremost, as the great constricting serpents do by their prey when they have killed and crushed it by the pressure of their enormous folds. It is curious to observe the adaptation of power by these constrictors. When a comparatively small boa, or python, seizes a rabbit, it becomes a congeries of coils around the victim; a large one applies one fold just sufficient to kill, without the useless application of further muscular pressure. In taking lizards and birds, the common snake swallows the prey head foremost, for the obvious reason of security; such, at least, is the result of my observation, as well as that of Mr. Bell, who kept a number of these serpents, one of which was an especial pet, and distinguished its master from all other persons. When let out of its box it would immediately go to him, and creep under the sleeve of his coat, where it would lie revelling in the warmth. Every morning, at breakfast, it came to his hand for its allowance of milk; but it fled from strangers, and hissed if they meddled with it.

By the way, Major Denham, in his *African Travels*, mentions an instance of the supposed virtues of the fat of serpents, when applied to beasts. Near Lari, he and his party killed an enormous snake, which he calls a species of coluber—a python, probably—measuring eighteen feet from the mouth to the tail. Five balls entered the serpent, but it was still moving off, when two Arabs, each armed with a sword, nearly severed the head from the body. On opening the reptile, several pounds of fat were found, and carefully taken off by the two native guides. They pronounced it to be a sovereign and much-prized remedy for diseased cattle.

As I looked at the collection of venomous serpents, the least of which carried death under its lips, the out-of-

the-way remedies which the savage and the half-civilized man successfully use came into my mind. Their cures, if we may believe honest witnesses, are far more frequent than those effected by European science.

Labat, when in the West Indies, was called to confess a young negro, who had been bitten by a serpent seven feet long, and as big as a man's leg, three fingers' breadth above the ankle. The serpent had been killed, under the idea that when it was dead the poison, by some sympathetic law, would act with less force. The patient was lying on a plank in the middle of his hut, between two fires, covered with blankets, and yet he said he was dying with cold, at the same time constantly crying for drink to assuage a devouring internal heat. He had also a prodigious desire to sleep. His leg was very strongly tied below and above his knee with a species of ozier, and both foot and leg were horribly swollen, and so was the knee, notwithstanding the ligatures. The worthy father confessed him, but was obliged to hold his hand, and keep moving it, to prevent him from sleeping during the ceremony. He afterwards recovered.

Captain Forbes, in his highly interesting book, *Dahomy and the Dahomans*,* relates that the natives have an infallible remedy for the bite of the deadly cobra. One of the captain's hammock-men had been bitten three times, but his father was a doctor. Walking one day through some long grass, the captain pointed to the bare legs of his attendant, and hinted at his danger. 'None,' said he; 'my father picks some grass, and if on the same day the decoction is applied, the wound heals at once.'

This did not seem strange to the captain, who had seen the fights between the cobra and the mongoose, in India. He says that the cobra has always the advantage

* Longman and Co. 1851.

at first, and the mongoose, apparently vanquished, retreats as far from his enemy as possible, but, on devouring some wild herb, revives, returns to the attack, and conquers. In short, he corroborates the accounts given by former travellers and observers, of these duels between the quadruped and the reptile.

The same author records that, in the kingdom of Dahomey, the killing by accident, or otherwise, of a fetish snake, was formerly punished by death; but that the penalty is now mitigated to running the gauntlet through the fetish priests, who belabour the criminal without mercy; nor is he free till he reaches water, to wash out his sin. The captain states that the lions of Whydah are the snake fetish house and the market. The former is a temple built round a huge cotton-tree, in which are, at all times, 'many snakes of the boa species' (python). These are allowed to roam about at pleasure; but, if found in a house, or at a distance, a fetish man or woman is sought, whose duty it is to induce the reptile to return, and to reconduct it to its sacred abode, while all that meet it must bow down and kiss the dust. Morning and evening, many are to be seen prostrated before the door, whether worshipping the snakes directly, or an invisible god, which is known under the name of 'Seh,' through these representatives, the gallant captain confesses that he is not learned enough to determine.

The fascination of serpents has been stoutly maintained by some, and as strongly denied by others. Acrell notices this phenomenon as being confirmed by the evidence of several of his countrymen, who had been a long while resident at Philadelphia. They related that the American rattlesnake, which they described as the most indolent of serpents, unquestionably possessed this power. They declared that, as the snake lies under the shade of a tree, opening his jaws a little, he fixes his brightly-glittering eyes upon any bird, or squirrel, which is in it.

The squirrel, so runs their account, utters a mournful and feeble cry, and, as if foreseeing his fate, leaps from bough to bough on every side, seemingly to attempt a sudden escape; but, struck with the fascination, he comes down the tree, and flings himself with a spring into the very jaws of his enemy. The observations of some Englishmen, continues Acrell, seem to confirm the truth of this. They shut up a mouse with one of these fascinating rattlesnakes in an iron box; the mouse sat in one corner—the rattlesnake was opposite to it. The reptile fixed its eye, terrible as Vathek's, upon the little trembler, which was, at last, forced to throw itself into the mouth of the serpent. Acrell adds, that the same experiment was repeated in Italy with a pregnant female viper, and with the same success.*

A piece of evidence, apparently unintentional, occurs in Captain Forbes's book, already noticed.

On passing from the viceroy's house at Ahomey (the grass very high), he observed, within an inch of his leg, *a small lizard, with its eyes fixed. It did not move on his approach.* At the same moment, a cobra darted at it, and before he could raise his stick, bore it away—'rather a narrow escape from death,' as the captain quietly observes. The captain makes no comment on that part of the adventure here printed in italics; nor does it seem to have occurred to him that he had under his eyes a proof of this deadly mesmerism.

Catesby thus tells the tale as 'twas told to him :

The charming, as it is commonly called, or attractive power, which this snake (the rattlesnake) is said to have of drawing to it animals, and devouring them, is generally believed in America; as for my own part, I never saw the action; but a great many from whom I have had it related, all agree in the manner of the process; which is, that the animals, particularly birds and squirrels (which principally are their prey), no sooner spy the snake than they skip

* *Am. Acad.*

from spray to spray, hovering and approaching gradually nearer their enemy, regardless of any other danger; but with distracted gestures and outcries descend, though from the top of the loftiest trees, to the mouth of the snake, who openeth his jaws, takes them in, and in an instant swallows them.

Animals of greater size, though they are not fascinated, are affected at the presence of these reptiles by the most violent feelings of abhorrence.

The largest I ever saw, says Catesby, was one about eight feet in length, weighing between eight and nine pounds. This monster was gliding into the house of Colonel Blake, of Carolina, and had certainly taken his abode there undiscovered, had not the domestic animals alarmed the family with their repeated outcries: the hogs, dogs, and poultry united in their hatred to him, showing the greatest consternation by erecting their bristles and feathers; and, expressing their wrath and indignation, surrounded him, but carefully kept their distance; while he, regardless of their threats, glided slowly along.

It is not an uncommon thing to have them come into houses; a very extraordinary instance of which happened to myself, in the same gentleman's house, in the month of February, 1723: the servant, in making the bed in a ground-room (but a few minutes after I left it), on turning down the clothes, discovered a rattlesnake lying coiled beneath the sheets in the middle of the bed.*

Catesby's evidence relative to the power of fascination is merely hearsay, it may be said; we will therefore call Lawson, an eye-witness:

They (rattlesnakes) have the power, or art (I know not which to call it), to charm squirrels, hares, partridges, or any such thing, in such a manner, that they run directly into their mouths. *This I have seen by a squirrel and one of those rattlesnakes;* and other snakes have, in some measure, the same power.†

I remember, many years ago, witnessing the effect produced by the sight of a serpent on the larger animals. I was enjoying my book—it was *The Lay of the Last Minstrel*—on a delicious warm spring day, under one of the trees in the upper part of our pretty hanging orchard,

* Carolina.

† *History of Carolina*, 1714.

then one sheet of blossom, when my attention was attracted by the loud outcries of several turkeys far away towards the lower part, where the fruit-trees ended. On looking up, I saw them surrounding a tuft of grass more than usually luxuriant. They craned over at this tuft, which they surrounded, keeping at a respectful distance, however, with ruffled plumage and half-expanded tails, uttering the short, often-repeated cry, *pit, pit, pit*, as turkeys do, when they are annoyed and frightened. As I advanced, their gestures and cries were redoubled; and, upon coming up, I saw a very large common ringed snake coiled up in the tuft. At my approach it started off, followed by myself and the turkeys, they still crying and gesticulating, but saved itself in the hedge. I could not help asking myself whether the Transatlantic blood in their veins had not roused their latent instincts, and impressed their brains with the notion that they had come upon one of the smaller rattlesnakes.

By the way, there is no longer a shadow of doubt that the serpents operated upon by the serpent-charmers at the Zoological Garden last year, had been deprived of their poison-fangs by mechanical means.*

Acrell, at the close of his statement relative to the alleged fascination of serpents, asks—‘Do we not see, in the summer, a parallel instance at home, in the toad, a most indolent animal, into whose mouth, as it lies in the shade or under a shrub, butterflies and other insects fly?’

Certainly the insects do fly into the toad’s mouth, but not, it may be suspected, without a little help; and this reminds me of the promise to give my readers some notion of the mechanism by which the tongue of that reptile acts with such marvellous rapidity and certainty in securing its prey.

Mr. Arscott, of Tehott, in Devonshire—’tis an old tale, but none the worse for that—kept a pet toad, which, when

* *Ante*, p. 204.

he first knew it, was called by his father 'the old toad;' and Mr. Arscott, *filis*, answers for a knowledge of it for thirty-six years. How long would it have lived?

Ay, that is the question, which a mischievous devil of a tame raven—those ravens are certainly supremely diabolical—took care should *not* be answered; for he dabbed one of the poor toad's eyes out with his horny beak, after kenning it, as if to satisfy himself, like one of Homer's heroes, where he could plant his dab so as to do it most mischief, as it came out one fine evening from the hole which its kind master had caused to be made for it under the third step, when he 'new-laid the steps;' and, at the same time, otherwise maltreated the poor sweltering pet, so that it was never the same toad again. The story is extant, and written in choice English, in the Appendix to Pennant's *British Zoology*, to which the reader is referred for the interesting details, which, while they show that the kind and observing narrator was ignorant of some things that modern science has made manifest, indicate the honest truth of his narrative.

Well; it had frequented the steps before the hall-door some years before he became acquainted with it. His father, who admired its size—which was of the largest the son ever met with—paid it a visit every evening. He himself constantly fed it, and brought it to be so tame, that it always came to the candle, and looked up as if expecting to be taken up and brought upon the table, where he always fed it with insects of all sorts. It was fondest of flesh maggots, which he kept in bran. It would follow them, and when within a proper distance, would fix its eye, and remain motionless for near a quarter of a minute, as if preparing for the stroke, 'which was an instantaneous throwing its tongue at a great distance upon the insect, which stuck to the tip by a glutinous matter;' and he adds, most truly, 'the motion is quicker than the eye can follow.'

And here is the solution of the so-called fascination, in which Linnæus himself believed; for in the *Systema Naturæ* (1766) the reader will find, under *Rana Bufo*, the following assertion: *Insecta in fauces fascino revocat.*

I always imagined—(says that acute observer, the younger Mr. Arscott)—that the root of its tongue was placed in the forepart of its under jaw, and the tip towards its throat, by which the motion must be a half-circle; by which, when its tongue recovered its situation, the insect at the tip would be brought to the place of deglutition. I was confirmed in this by never observing any internal motion in his mouth, excepting one swallow the instant its tongue returned. Possibly I might be mistaken, for I never dissected one, but contented myself with opening its mouth and slightly inspecting it.

No, my good Mr. Arscott, you were not mistaken; and you have described the process beautifully; but *how* is the action performed?

The anomalous structure and position of the tongue in most of the anurous or tailless batrachians*—that is, tailless in their last and most perfect state—are very striking. Soft and fleshy almost throughout, that organ is, in the toad, unsupported at its base by any internal bone. The *os hyoides* is altogether absent, and the tongue is attached anteriorly in the concavity formed by the two branches of the lower jaw towards the symphysis, so that its root, instead of being at the back of the fauces, is in the interior edge of the fore part of the lower jaw, and its free extremity is in the back part of the mouth, and before the aperture of the air-passages, when it is at rest. When in action, it becomes considerably elongated, and is projected sharply out of the mouth, as if it turned on a pivot in the anterior edge of the jaw; so that, when thrown out, the surface which was under when in repose

* In *Dactylethra*, the tongue is attached at the back of the mouth; and *Pipa* has none.

in the mouth, comes uppermost; and, when returned into the mouth, the surface which an instant previously was uppermost, resumes its original position, and is lowermost. A viscous secretion, which is very tenacious, completes this engine of destruction; and when employed in the capture of prey, it reaches to a considerable distance, and returns with the insect into the mouth, where the morsel is generally compressed, involved in a further glutinous sort of saliva, and submitted to the action of deglutition. The muscular machinery by which this action, so important to the animal, is effected, is a beautiful example of adaptation; for the muscles which regulate the motion of the bones and cartilages of the mouth act more especially upon the lower jaw, the bone of the mandible and the tongue, which is by their power shot forth and returned with the prey with such celerity, that, as has been before observed, he must have a very acute and prompt vision who can detect the action. Most observers will see that when an insect comes within tongue-shot of a toad when upon its feed, it disappears; but few will detect the action of the tongue itself, if the reptile be healthy and lively.

Mr. Arscott's old toad had none of that antipathy to spiders which old legends would have us believe existed between those reptiles and insects: he used to eat five or six with his millipedes, which Mr. Arscott took to be his favourite food, and which were provided for the pet, till his master found out that flesh maggots, by their continual motion, formed the most tempting bait. When offered blowing-flies and humble-bees, it would take them,—and, in short, any insect that moved; and Mr. Arscott imagined that if a honey-bee had been put before it, it would have eaten it, to its cost. Bees, however, are seldom stirring at the same time as toads, which do not often venture forth after sunrise or before sunset, though they will occasionally come to the mouth of their hole in

the heat of the day, probably for air. But Mr. Arscott once observed another large toad, which he had in the bank of a bowling-green, at noon on a very hot day, 'very busy and active upon the grass; so uncommon an appearance,' says he, 'made me go out to see what it was, when I found an innumerable swarm of winged ants had dropped round his hole, which temptation was as irresistible as a turtle would be to a luxurious alderman.'

The pet-toad that lived under the steps did not long survive the rough usage of that malicious fiend, the raven. It never enjoyed itself, to use Mr. Arscott's expression, after the attack, and had a difficulty in taking its food, missing its mark for want of the eye of which the raven had deprived it; and so it languished, and, languishing, did live for a twelvemonth, when its life and sufferings ceased together.

I have satisfied myself that there is hardly any insect of proportionate size that a toad will not take when in motion; and if an artificial fly were moved before it, within tongue-shot, it would doubtless take it. Most of us have heard of the *mauvaise plaisanterie* of throwing small pieces of glowing charcoal to the poor bull-frog, which swallowed them to its destruction, taking the burning coals for fireflies; thus dying, involuntarily, the death of Cato's daughter.

'They that write of toads,' quoth Master Philemon Holland, in his translation of Pliny, 'strive *à-vie* who shall write most wonders of them; for some say, that if one of them be brought into a place of concourse, where people are in great number assembled, they shall be all hush, and not a word among them.'

If this were but true, what a blessing an importation of them would be into a certain great house, where words *now* are much more plentiful than acts.

No kitchen where the cooks are too apt to boil at a gallop, instead of regulating the pot at that gentle rate

which alone can ensure the tenderness of the joint, should be without the following bit of the toad's skeleton—

'They affirm also that there is one little bone in their right side, which, if it be thrown into a pan of seething water, the vessel will cool presently, and boil no more until it be taken forth again. Now this bone (say they) is found by this means: If a man take one of these venomous frogs or toads, and cast it into a nest of ants, for to be eaten and devoured by them, and look when they have gnawed away the flesh to the very bones, each bone, one after another, is to be put into a kettle seething upon the fire, and so it will soon be known which is the bone, by the effect aforesaid. There is another such like bone (by their saying) in the left side; cast it into the water that hath done seething, it will come to boil and wallow again. This bone (forsooth) is called Apocynon; and why so? Because *y-wis*, there is not a thing more powerful to appease and repress the violence and furie of curst dogs than it.'

While some have proclaimed the toad as the most poisonous of animals, others have denied it any noxious qualities whatever.

According to Ælian, death not only lurked in its breath, but its very aspect killed, so that the basilisk had in it a potent rival. 'The precious jewel in its head' was considered to be the redeeming quality in the 'ugly and venomous' creature. This jewel was not its brilliant and beautiful eye, which the earthy croaker was said to have exchanged with the heavenly lark,* but a stone well

* The love-sick Juliet exclaims :—

'It is the larke that sings so out of tune,
Straining harsh discords and unpleasing sharps.
Some say the larke makes sweet division;
This doth not so: for she divideth us.
Some say the larke and loathed toad change eyes,
O now I would they had chang'd voices too.'

known to the collectors of the last century as the bufonite, toad-stone, crapaudine, and krottenstein, supposed to be largely endowed with medical and magical powers, and familiar to the philosophers of the present, as one of the fossil palatal teeth of a fish (*pycnodus*).

The whole animal was a repertorium for poisoners before the modern Canidias had hit upon the powder of succession. The Roman ladies who did *not* love their lords, hastened their departure for the city of the dead by a bufonite potion,* or an infusion of rubetan juice in a cup of rich Celanian;† and as poisoning and witchcraft generally went hand in hand,‡ there is no cause for surprise that toads were choice contributions for the charmed pot of secret, black, and midnight hags. ‘Paddockes calls’ the witches in *Macbeth*: and the reptile was the first ingredient in the caldron that raised the blood-bolter’d Banquo, and seared the eyeballs of the murderous thane with the regal ‘show’ of the disquieted spirit’s line.

The eleventh hag, in Jonson’s *Masque of Queens*, exultingly sings—

I went to the toad, breeds under the wall;
I charm’d him out, and he came at my call.

And Gesner ascribes a power to it which was believed to conduce to the quiet of mankind at the expense of their vigour.

But those who assert the bad eminence of the toad for ‘swelter’d venom,’ and those who deny it all noxious qualities—Pennant was inclined to the latter opinion, and Cuvier believed it to be innocuous,—are both wrong. The exudation from the pimples, or follicles, on the true

* Juvenal, *Sat.* vi. 558.

† Ibid. *Sat.* i. 69.

‡ ————— An malas

Canidia tractavit dapes?—Hor. *Ep.* iii. 8.

§ *Padda* and *Tassa* are the names assigned to the toad in the *Fauna Suecica*.

skin of the toad, especially about the head and shoulders, was proved by Dr. Davy to be a very acrid secretion, resembling the extract of aconite when applied to the tongue, and even acting upon the hands. Pressure causes this fluid to be emitted, occasionally to some distance, and the defence stands the toad often in good stead, especially when attacked by dogs, which have been frequently seen to drop the troublesome customer from their mouths, with a shake of the head even more eloquent than Lord Burleigh's. And yet this secretion, more acrid than the poison of serpents, produces no effect when introduced into the circulation. A chicken was inoculated with it, and no alteration was perceptible in its actions or health.

Those who are interested in the marvellous stories of 'antediluvian toads' will be well rewarded by consulting Dr. Buckland's paper on the subject, in the fifth volume of the *Zoological Journal*. He made several experiments by shutting them up in cells, fashioned in a large block of oolitic limestone, and in another of compact siliceous sandstone, and buried the blocks with the imprisoned toads three feet deep in his garden. He placed others each in a small basin of plaster of Paris, four inches deep and five inches in diameter, and well luted them over with a covering of the same material. These were buried with those immured in the blocks of stone. He enclosed some in three holes cut for the purpose in the trunk of an apple-tree. Two were placed in one hole; the others were imprisoned singly, and the holes were tightly plugged up. The result of these experiments was, a conclusion that toads cannot live a year excluded totally from atmospheric air, and that they cannot survive two years, if entirely prevented from obtaining food.

But let us, before we depart, look into the reptile-house on a warm summer night. We enter with a dark

lanthorn. The light is no sooner unveiled, than it seems to have a Promethean effect on the statue-like forms that were so still in the morning. Now the scene is changed: now all is action, terrible action; and we behold the monstrous constricting serpents, and the horrible poisonous snakes, and the uncouth lizards, writhing, coiling, creeping, running, and pushing against the transparent walls of their crystal prison, till the nervous anxiety of some temperaments may be pardoned for huddling up to the keeper, and inquiring, with bated breath, whether the glass is python and boa-constrictor proof?

March 27th.—The rain it raineth every day. The peck of dust, worth a king's ransom, will hardly be forthcoming, and the farmer begins to be uneasy about his oats. The garden in the Regent's Park is a swamp. Both the great and the smaller tortoise in the ostrich-house are dead, as I feared. A small one that buries itself two or three feet deep in the earth exposed to all the skiey influences, does well. Hippo is flourishing, and now has clover-chaff tea, with the boiled chaff as a change of diet. He drinks the tea, and then eats the sop. His tank in the open air is advancing rapidly towards completion. The beautiful crested pigeons,* with their hybrid young one, are in fine condition. On the 8th September, in the last year, I found *Goura Victorizæ* on her nest, with her young one able to fly. On that day it was five weeks old. The male bird, *Goura coronata*, better known as 'the great Amboyna pigeon,' which belongs to her Majesty, was strutting about on the ground. His productive alliance with the species which bears our gracious Queen's name is worthy of notice, particularly when the difference of climate is taken into the account. The egg—there was only one—from which the hybrid sprung was sat on twenty-eight days before the young

* *Goura coronata* and *Goura Victorizæ*.

bird was hatched, by both parents; but the male was most assiduous and the best nurse.

An egg was laid and hatched in 1849, but the young one died a day or two after its exclusion. The birds showing a disposition to sit in 1850, the cover of a basket was placed upon the angle of a stout, forked pole, in the great aviary; and a few birch twigs were furnished to them. Out of these rough materials they made a nest. They sat side by side. The male always sat with his head fronting the spectator, or nearly so, as if he was keeping watch, and the female with hers exactly in the opposite direction, so that the head of the cock was parallel to the tail of the hen. The young one was fed from the crops and mouths of both parents. The late Lord Derby sent to Sir Robert Heron, whose success in breeding animals is well known, a pair of very large pigeons, called chequered starlings. The female came ill, and died in about six weeks. A fortnight before her death she laid two eggs, but being too ill to sit, that operation was perseveringly performed by the male, with her full consent, as she frequently sat by him. At her death, he abandoned the eggs; may not this abandonment have been the result of consciousness that, without a partner to aid in feeding the young, it was hopeless to attempt to rear them?

And here we cannot but feel with John Hunter, who discovered the curious organization in the dove kind, which enables the parents to support their young with the curd-like contents of their crops,—from their own bodies, in short, as the mammalia do in the early stages of the existence of their offspring,—that the nourishment of animals admits perhaps of as much variety in the mode by which it is to be performed, as any circumstance connected with their œconomy, whether we consider their numerous tribes, the different stages through which every animal passes, or the food adapted to each in their dis-

inct conditions and situations. The food fitted for one stage of life is rejected at another.

Animal life (as Hunter observes) may be divided into three states, or stages: the first comprehending the production of the animal, and its growth in the foetal state the second commencing when it emerges from that state by what is called the birth, but leaving it for a time either mediately or immediately dependent on the parent for support; the third, when the animal is able to act for itself. As a general proposition, it may be laid down that the first and third stages are common to all animals; but some classes—fishes and spiders, for instance—pass directly from the first to the third, having no intermediate stage.

The great physiologist then notices the infinite variety in which Nature provides for the support of the young in the second stage of animal life, and that brings him to the statement of his discovery. He tells us, and tells us truly, that the young pigeon, like the young quadruped, till it is capable of digesting the common food of its kind, is fed with a substance secreted for that purpose by the parent; not, as in the *mammalia*, by the female alone, but by the male also, and perhaps more abundantly than by the female.

Every person who has kept parrots, maccaws, and birds generally of that family, must have noticed the power possessed by them of throwing up the contents of the crop, and feeding each other. Hunter, in common with others, saw a cock paroquet regularly feed his hen, by first filling his own crop, and supplying her thence from his beak; and he notices, what every observer who has kept such birds must have remarked—namely, that when they are very fond of the person who feeds and attends upon them, they perform the action of throwing up food, and often do it. The cock pigeon, when he caresses the hen, goes through the same forms of action as when he

feeds his young; but Hunter adds, that he does not know if at this time he throws up anything from the crop. I have observed a similar action, during the breeding season, in rooks; and I have reason to believe that the cocks feed the hens while they are sitting, as well as the young, with food saved in a kind of gular pouch under the lower mandible, but I do not know whether they feed either the hens or the young with food which has undergone any alteration in the crop, or whether the hens feed their young or their mates with such provender. Hunter, from the observations made by him on the parrot-kind, states that he has reason to suppose that they are endowed with the same power as the pigeons.

As the breasts or udders of mammiferous females become gradually enlarged and thickened at the time of uterine gestation, so, during incubation, are the coats of the pigeon's crop; and John Hunter, on comparing the state of that organ when the bird was not sitting, with its appearance during incubation, found the difference very remarkable. In the first case, it was thin and membranous; but by the time when the young were about to be hatched, the whole, except the portion which lay under the trachea, became thicker, and assumed a glandular appearance, having its internal surface very irregular. It was likewise evidently more vascular than in its former state, in order to the conveyance of a quantity of blood sufficient for the nourishing substance.

'Whatever may be the consistence of this substance when just secreted, it most probably very soon coagulates into a granulated white curd, for in such form,' says Hunter, in continuation, 'I have always found it in the crop; and if an old pigeon is killed just as the young ones are hatching, the crop will be found as above described, and in its cavity pieces of white curd, mixed with some of the common food of the pigeon, such as barley, beans, &c. If we allow either of the parents to

feed the brood, the crop of the young pigeons when examined will be discovered to contain the same kind of curdled substance as that of the old ones, which passes from thence into the stomach, where it is to be digested.'

The joke about 'pigeon's milk' is not so groundless, after all. But see how beautifully this dispensation is ordered, according to the exigences of the nestling :—

The young pigeon is fed for a little time with this substance only, as about the third day some of the common food is found mingled with it : as the pigeon grows older, the proportion of common food is increased ; so that by the time it is seven, eight, or nine days old, the secretion of the curd ceases in the old ones, and of course no more will be found in the crop of the young. It is a curious fact, that the parent pigeon has at first a power to throw up this curd without any mixture of common food, although, afterwards, both are thrown up, according to the proportion required for the young ones.

I have called this substance curd, not as being literally so, but as resembling that more than anything I know ; it may, however, have a greater resemblance to curd than we are perhaps aware of, for neither this secretion, nor curd, from which the whey has been pressed, seems to contain any sugar, and do not run into the acetous fermentation. The property of coagulating is confined to the substance itself, as it produces no such effect when mixed with milk. This secretion in the pigeon, like all other animal substances, becomes putrid by standing, though not so readily as either blood or meat, it resisting putrefaction for a considerable time ; neither will curd much pressed become putrid so soon as either blood or meat.*

Those who would wish to examine this phænomenon more closely will find preparations of the pigeon's crop in that noble museum,† which is John Hunter's best monument. No young birds are in so forlorn a state as

* *Animal Economy*, edited by Professor Owen. Longman and Co.

† The museum of the Royal College of Surgeons of England, rendered doubly valuable by the learned and elaborate Catalogue by Professor Owen, in 5 vols. 4to. The preparations are numbered 3737 to 3741, both inclusive.

young pigeons, if the parents are killed before the young can provide for themselves. Birds of other species, stimulated by the cries of the starving young which have been deprived of parental aid, can and do assist the little wretches; but none except an old pigeon with its crop in a proper state can save the life of a nestling dove.

The gouras, by whose alliance a third columban form of the same race has been ushered into this breathing world of ours, in their natural state are probably employed, like others of the dove kind, in disseminating the fragrant nutmegs through New Guinea, the Malaccas, and other islands. For Sonnerat declares, and with truth, that the pigeons which swallow the nuts whole are nourished by the enveloping case, which is alone digested, leaving the nut itself uninjured, or rather more readily prepared for germinating on the soil whereon it is dropped.

The Zoological Society possesses a very fine collection of *Columbidæ*, and a most interesting tribe they are. Messengers of love, of peace, and of war, they are allied very nearly, as we have seen above, to the *mammalia* in one part of their organization, and resemble them in some of their habits; for pigeons do not drink like most birds, by taking up a small quantity of water at a time, and throwing the head upward and backward, but, like horses or kine, suck up a long continuous draught without raising the head, till thirst is satisfied.

Columba: whence the name? Varro declares from its cooing. Did the same impression of its notes on the ancient British ear call forth a similar appellation, and induce our ancestors to name the birds colomen, kylobman, kulm, kolm, and culver?

The perseverance with which some of the varieties, the carriers especially, when well trained, will return from very long distances, is wonderful:

It blew and it rain'd,
 The pigeon disdain'd
 To seek shelter,—undaunted he flew ;
 Till wet was his wing,
 And painful the string,
 So heavy the letter it grew.

The same faculty, which in comparatively modern times was degraded to giving notice to the authorities that the finisher of the law had done his duty on the Tyburn hanging days—Hogarth's graphic record of the custom will occur to most,*—which afterwards sank to being the bearer of the news of the prize-ring, and, now-a-days, conveys the price of stocks to and from the Continent, or brings the first intelligence of the winner of the Derby, kept Hirtius and Brutus constantly informed of each other's designs and movements, as the besieger, Antony, felt to his cost. In vain did he spread his nets, and try every stratagem to baffle these couriers of the air : he had the mortification of seeing them going and returning to and fro over the beleaguered walls of Mutina. Anacreon's dove was employed on a more gentle mission.† And Taurosthenes sent one decked with purple to his happy father in the Island of Ægina, with the news of his victory at the Olympic games on the day of the pigeon's arrival.‡ We have the authority of Sir John Maundeville—he who made his way to the border of China in the reigns of our second and third Edward—that the Asiatics used them for the same purpose as the Romans.

'In that contree, and other contrees bezonde,' says that knight, warrior, and pilgrim, 'thei han a custom whan thei schulle usen werre, and whan men holden sege abouten cytee or castelle, and thei withinnen dur not senden out messangers with lettere, fro

* Etty's dove ascending at the moment of Joan's agony, and heralding the conclusion of the ardent logic of the stake, will also be remembered.

† Ode 9.

‡ Ælian.

lord to lord, for to aske sokour, thei maken here letters and bynden them to the nekke of a *colver*, and letten the *colver* flee : and the colvern been so taughte, that they flee with the letters to the very place that men wolde sende them to. For the *colveres* been norysht in the places where thei ben sent to : and thei senden hem thus far to beren here letters. And the *colveres* retournen azen where as thei ben norisscht, and so they don commounly.'

During the crusade of St. Louis* they were so employed ; Tasso pressed them into the service in the siege of Jerusalem ; † and Ariosto makes a dove the messenger that spread the news of Orrilo's death through Egypt.‡

The rapidity and power of flight of some of the species is almost incredible. The passenger-pigeon § has been killed in the neighbourhood of New York with its crop full of rice, which the bird could not have procured nearer than the fields of Georgia and Carolina. Audubon, who relates this startling, but, I believe, true fact, observes that, as their power of digestion is so great that they will decompose food entirely in twelve hours, the birds which were taken in the neighbourhood of New York must have travelled between three and four hundred miles in six hours, an average of speed that reminds one of the famous horse Childers. He, however, could not have sustained his 'flying' pace of a mile a minute for more than a very short period, whereas the bird is capable of keeping up its wonderful rate of progression during many successive hours. The passenger-pigeon would thus, as Audubon observes, be enabled, were it so inclined, to visit Europe in less than three days. Instances are not wanting of its presence here ; but the American naturalist who presented a number of these birds to the Earl of Derby, in 1830, with whom they bred, seems to think that those which have been seen at liberty in this country had escaped from some aviary.

* Joinville.

† Book xviii.

‡ Canto xv.

§ *Ectopistes migratoria*. Swainson.

Wagers have been laid and matches have been made to determine the rate of a carrier-pigeon's flight. In 1808 a young man in the Borough undertook that his pigeons would fly thirty-five miles in one hour. Three were thrown up at five o'clock in the evening beyond Tunbridge Wells, and arrived at their owner's residence in fifty-three minutes, thus beating time by seven minutes. A gentleman had a wager on this event, and he sent a pigeon by the stage coach to Bury St. Edmund's, with a request that the bird, two days after its arrival there, might be thrown up as the clock struck nine in the morning. This was done; and at half-past eleven o'clock on that morning the pigeon was shown at the Bull Inn, Bishopsgate, into the loft of which respectable establishment it had entered, having made its way to that point in London in two hours and a half, and having traversed seventy-two aerial miles.

When the trial of the annual prize for the best carrier-pigeon was decided at Ghent on the 24th of June, 1833, twenty-four birds which had been conveyed from that town were thrown up at Rouen at fifty-five minutes after nine o'clock in the morning. The distance is 150 miles, be the same, in lawyer's phrase, more or less, and the first pigeon arrived at Ghent in an hour and a half, sixteen came in within two hours and a-half, and three in the course of the day. Four were lost.

He who would train a carrier-pigeon must take a young one that is fully fledged, and convey it in a basket or bag, at first not more than half a mile from home, and then turn it loose. After a repetition of this short journey twice or thrice, the future messenger should be taken to a distance of two, four, eight, ten, twelve, fifteen miles, and so on, and then turned loose, till it will return from the most remote parts of the kingdom. The younger the bird is, if it have strength to fly well, the greater is the chance of educating it for a trusty bearer

of a despatch. If this drilling is not commenced early, birds of the best breed cannot be trusted. Those who would succeed, are careful to keep the pigeon about to be sent off, in the dark without food for some seven or eight hours before it is loosed. When thrown up, the bird rises, and when it has reached a good height, will at first fly round and round, and then make off, continuing on the wing without stop or stay, unless prevented, till its well-known home is reached. A word to the wise by the way. Never throw up your bird in a fog or hazy weather, or 'tis ten to one against its reaching its destination, or your seeing it again. Those who have been in the habit of travelling by the short stages or omnibuses in the neighbourhood of London—to Hampton and Sunbury, for instance—must have observed one of these aërial messengers suddenly delivered from its darksome bag and thrown up by one of the 'outsides' to find its way home.

The spiral flight, when the birds are thrown up, is evidently a flight of observation, and when they catch sight of any well-known landmark, away they go homeward. But they are lost if no such objects are within ken. Thus pigeons, when loosed from a balloon at a great height, after flying round and round, have returned to the balloon for want of objects to guide them in their flight homeward. And yet there is on record a wonderful instance of their return to their domicile under circumstances of great difficulty, to say the least of it, as far as guide-marks are concerned.

The battle of Solebay was fought on the 28th of May, 1672. Captain Carleton was a volunteer on board the *London* man-of-war in that engagement, and he relates that on the first firing of the *London's* guns, a number of pigeons, kept in the ship, and of which the commander was very fond, flew away. Nowhere were they seen near during the fight. It blew a brisk gale next day, and the

British fleet was driven some leagues to the southward of the place where the birds forsook the ship. The day after, back came the pigeons—not in one flock, but in small parties of four or five at a time, till all the birds were safe on board.

This unexpected return caused some conversation on board; when Sir Edward Sprage told those who expressed their surprise, that he brought those pigeons with him from the Streights, and that when he left the *Revenge* for the *London*, all those birds, of their own accord, and without the trouble or care of carrying, left the *Revenge*, and removed with the seamen to the *London*.*

Our tame varieties are generally considered, and with good reason, to be derived from the Blue Rock pigeon, or Rockier.† Pennant describes this species as swarming in the Orkneys and Hebrides, and says that, in the Orkneys, they collect by thousands towards winter, and do great damage to the rick-yards. He saw in Ilay the bottoms of the great chasms covered with their dung for many feet in thickness, which was drawn up in buckets, and used successfully as manure. But great as is the facility with which they are domesticated, they occasionally show symptoms of their original wildness. Pennant knew a dovecot, not far from Orm's-head, where the pigeons resided, on account of the supply of food, till the breeding season, when liberty and love led them from the artificial pigeon-holes to those wild and vast rocks.

This species abounds in the rocky islands of the Mediterranean, and was no stranger to Virgil, as the beautiful lines in the fifth book of the *Æneid* ‡ show.

* Carleton's *Memoirs*; and see Yarrell's highly interesting *British Birds*.

† *Columba livia*.

‡ L. 213, &c.

Even in this vast brick Babylon, some pigeons breed about Somerset House, both on the river and land side. They are probably birds which have been domesticated, and have escaped, preferring a comparatively wild life, with the supplies afforded by the wharves and barges.

The proneness to domestication in this bird, or rather in one of the varieties from it, was strongly contrasted with the impracticability of reconciling the ring-dove, cushat, or wood-pigeon (*Columba palumbus*), to captivity, in Colonel Montagu's experiment. It is true that he tamed them within doors, 'so as to be exceedingly troublesome;' but he never could produce a breed, either by themselves or with the tame pigeon. Two were bred up by him together with a male pigeon, and were so tame as to eat out of the hand; but the genial spring brought no signs of breeding, so they were suffered to take their liberty in the month of June, by opening the window of the room in which they were confined, the Colonel thinking that the pigeon might induce them to return to their usual place of abode, either for food or to roost: but no; they instantly took to their natural habits, and the Colonel saw them no more. The pigeon continued to return.

The goura, it will be remembered, contrary to the general habit of the Columbidae, laid only one egg, and the passenger-pigeon, according to Wilson, lays no more. In 1832, a pair of passengers began a nest on the 25th of April, in a fir-tree planted in one of the enclosures in the Garden in the Regent's Park. The hen was the architect, but the cock was the labourer. Most perseveringly did he collect and convey to the selected spot, sticks, straws, and other nest materials. Every time he came in with his building materials, he alighted on the back of the hen, so as not to disturb any part of the structure which she had fashioned. On the morning of the 26th, one egg was laid, and the hen immediately

began to sit. The cock took his turn at incubation, and when sixteen days had passed, the young bird appeared.

But if only one egg is laid by the passenger-pigeon, the numbers of the species exceed belief, and they afford a most plentiful supply to our Transatlantic cousins. Their roosting-places in those deep and extensive forests exhibit an extraordinary spectacle. The dung-covered ground is strewn with the limbs of the trees broken down by their weight; the grass and under-wood are destroyed, and not unfrequently thousands of acres of trees are killed. Upon the discovery of one of these roosts, the whole country comes in to wage war upon the birds during the night, with all sorts of destructive engines: guns, clubs, long poles, and sulphur-pots, are plied in all directions, till the invaders have filled their sacks and loaded their horses to their hearts' content.

But the breeding-places are even more extensive than the roosts. These, in the States of Ohio, Kentucky, and Indiana, are generally in the backwoods, and often extend far across the country. Wilson saw one not far from Shelbyville, in Kentucky, which stretched nearly north and south through the woods, extending upwards of forty miles, with a breadth of several miles. In this tract, almost every tree bore nests, wherever there was nest-room in the branches. The pigeons made their first appearance about the 10th of April, and those which escaped left the place with their young before the 25th of May. As soon as the young were fully grown, and before they all left the nests, large parties of the inhabitants came from all the parts adjacent, with waggons, axes, beds, and working utensils, and, with their families, encamped at this immense nursery. Some of them told Wilson that the noise was so great that their horses were terrified, and that it was difficult for one person to hear another speak without bawling in his ear. The scene

must have been exciting and disgusting. The ground was strewn with broken limbs of trees, eggs, and young squab pigeons, on which herds of hogs were fattening. In the air, great numbers of hawks, buzzards, and eagles were sailing, bearing away the squabs from their nests at pleasure, while from twenty feet upwards to the tree-tops was one perpetual tumult of crowding and fluttering multitudes of pigeons, their wings roaring like thunder. This din was heightened by the crash of falling timber, as the strokes of the axemen brought down the trees most crowded with nests, which they contrived to fell so as to bring down several other trees in the fall. Two hundred squabs, little inferior in size to the old ones, and one heap of fat, were sometimes collected from one fallen tree. Each nest contained one squab only.

Wilson passed for several miles through this same breeding-place, after the pigeons abandoned it for another sixty or eighty miles off, and saw enough of the remains of the nests to satisfy him that the account which he had heard was not exaggerated. The great numbers that passed over his head confirmed him in this opinion. Notwithstanding the havoc that had been made among the birds, they still swarmed. The mast had been for the most part consumed in Kentucky; and every morning, a little before sunrise, masses of these pigeons set out for the Indiana territory, about sixty miles distant. Many of them returned before ten o'clock, but the main body generally appeared on their return a little after noon.

Wilson had left the public road to visit the ruins of the breeding-place near Shelbyville, and was traversing the woods with his gun on the way to Frankfort, when, about ten o'clock, the pigeons which he had observed during the greater part of the morning flying northerly, began to return in such immense numbers as he had never before seen. He stopped at an opening by the side of Benson Creek, where he had a more uninterrupted

view, and there to his astonishment he beheld them flying with great steadiness and rapidity at a height above gun-shot, in several strata deep, and close together. On they came, and from right to left as far as the eye could reach, the breadth of this vast winged procession, everywhere equally crowded, extended. He took out his watch to note the time, and sat down to observe the passing masses. It was half-past one, and for more than an hour did Wilson sit, expecting that this aerial animal stream would cease to flow, but instead of a diminution, the vast procession seemed to increase in numbers and rapidity. As he was anxious to reach Frankfort before night, he rose and went on. At that town he crossed Kentucky river, about four o'clock in the afternoon, at which time the living torrent above his head seemed as strong and as extensive as ever. Long after this, large bodies continued to pass for six or eight minutes. These were followed by other detached flights, all moving in the same south-east direction, till after six o'clock in the evening.

A rough calculation of this mass was made by the delightful American ornithologist, and he came to the conclusion that its whole length was 240 miles, and that the numbers composing it amounted to 2,230,272,000 pigeons at least; indeed, he expresses his conviction that these enormous numbers are probably far below the actual amount.

Think of the consumption of such legions. Wilson did think of it, and observes, that allowing each pigeon to consume half a pint of food per diem, the whole quantity would equal 17,424,000 bushels daily.

Audubon, who has, to the great regret of his friends, lately gone, full of years and of honours, by that dark road which must be passed by us all, confirms Wilson in every particular, except that Audubon declares that the passenger-pigeon lays *two* eggs. We have seen that, in confinement, this bird, like the gouras, laid but one.

Lawson, in his *Natural History of Carolina* (1714), records facts which confirm Wilson and Audubon as to the number of these pigeons, declaring that the flocks, as they passed, in great measure obstructed the light of day.

The great fertility of the dove-kind suffices to keep up numbers more than adequate to resist the attacks of hawks and other birds of prey, and the still more sweeping destruction of man, the omnivorous. Biberg* remarks, that if you suppose two pigeons to hatch nine times a-year, they may produce in four years 14,672 young; and Stillingfleet states that these numbers ought to have been 14,760, or the expression should have been altered, for Biberg includes the first pair.

On the day that I observed the young hybrid goura, I watched the wart-hogs (*Phacochærus*). Their mode of attack is by going on their knees like the gnu; and, young as they were, they already had callosities on those parts. They were exercising their tusks in a sham fight with an empty bag, which, dropping on their knees, they charged, tossed up, and, rising, caught it on their tusks. In the course of their gambols, they threw the bag on the top of the railing of their enclosure. One of them raised itself on its hind legs, jumped at it, and pulled it down with its mouth, when they resumed their game with it. The attack of the full-grown animal, with its enormous, sabre-like tusks, must be most formidable.


Shortly afterwards, I came on a flock of ten hoopoes, and stood admiring their butterfly-like flight, which must aid them in their escape from hawks, as the desultory motions of the butterflies when on the wing save them from fly-catchers and other small birds.

The three young grisly (?) bears were in high force, one appealing to the people most energetically for supplies, another dancing merrily, and the third lagging behind

* *Am. Acad.*

with a sort of minuet step. This lag had, no doubt, his reasons for remaining in the back-ground, for I observed that when the spectators threw food to the party, it frequently passed over the two foremost, and was quietly appropriated by the retiring character. The attitude of the orator was a study for St. Stephen's. They are evidently favourites, and all three came in for their share; but the Cleon of the party secured the greatest portion of the eleemosynary biscuit.

5th April, 1851.—New lion arrived from South Africa, and good friends with Cocksedge already, The Sumatran tapir looked in good health. The carunculated crane and lovely mandarin ducks in high feather. Works everywhere in progress to add to attraction in this *annus mirabilis*. Hippo was having a game of romps with a young Egyptian gentleman lately come over, but kept in the water, and now and then made a very queer face at his playmate. The tank in the open air near the giraffe-house is finished, and seats are preparing for the spectators, so that a multitude of all nations may, during this exhibiting summer, see Hippo in his bath at their ease. A building is rising for Mr. Gould's magnificent collection of humming-birds, the finest and most numerous ever brought together. Though the true Egyptian crocodile died on the voyage, there is no reason to doubt that another may be soon forthcoming. Poor Mr. Duncan had done his best to interest the King of Dahomey to obtain a live African elephant, as our readers may remember, but Captain Forbes, who seems actuated by the same kindly feelings towards the Society, found that the king classed this attempt among the impossibilities. His Majesty could understand how a wild elephant might be entrapped into a pitfall,—but to get him out and lead him away—no—he could not or would not believe in the possibility of that. But if there is a failure in the south, the Viceroy of Egypt rules in the north; and there are safe grounds for hoping, that through His Highness's



powerful liberality, both an African elephant, and a rhinoceros may be forthcoming, good Mr. Murray being on the spot to take care of the much-desired additions. With the tide of foreigners setting in to inundate these islands, two oranges from Borneo, three feet high, and rejoicing in the names of Darby and Joan, are coming. Despatches have already been received, with a programme for their treatment from morning till night :

Every day, when they go to dine,
They're to have, at one, a slice of pine !

Poor dear Theodore ! If he were spared to us, what a second edition of *The Chimpanzee* we should have.

Negotiations are pending with Leyden for a visit from the gigantic Salamander, *Sieboldtia maxima*.* I should not be surprised if Mr. Mitchell, with whom all things seem possible, were, by hook or by crook, to beg or borrow an egg of the gigantic bird of Madagascar, fit rival for the New Zealand Moa.† Two of these eggs, besides fragments, are in Paris. Each would hold six ostrich eggs, sixteen emeu eggs, one hundred and forty eggs of the common barn-door hen, and a thousand humming-bird eggs. Old Sinbad was a true man, after all ; and we may catch a Rok yet.‡

May, 1851.

* *Ante*, p. 103.

† *Dinornis* (Owen). Nearly a perfect skeleton of this form has been found lying together, and is on its way to this country.

‡ I have just seen (April 19) the Asiatic elephant, with her calf, seven months old, at her side. They have been secured to the Zoological Society by the energetic management ; and I hear that ' more elephants ' are coming. Four are now to be seen in this noble collection ; and before the year is out, a herd will probably be exhibited in the Regent's Park.

LONDON:
SAVILL AND EDWARDS, PRINTERS, CHANDOS STREET,
COVENT GARDEN.

Now Ready, 8vo, price Ten Shillings and Sixpence,

**A MANUAL
OF
GEOGRAPHICAL SCIENCE.**

**EDITED BY THE
REV. C. G. NICOLAY, F.R.G.S.**

**PART THE FIRST,
CONTAINING
MATHEMATICAL GEOGRAPHY,**

**By REV. M. O'BRIEN, M.A., F.R.S.
PROFESSOR OF NATURAL PHILOSOPHY AND ASTRONOMY IN KING'S COLLEGE, LONDON.**

PHYSICAL GEOGRAPHY,

**By D. T. ANSTED, M.A., F.R.S.
PROFESSOR OF GEOLOGY IN KING'S COLLEGE, LONDON.**

CHARTOGRAPHY,

**By J. R. JACKSON, F.R.S.
LATE SECRETARY OF THE ROYAL GEOGRAPHICAL SOCIETY.**

**THEORY OF DESCRIPTION AND GEOGRAPHICAL
TERMINOLOGY,**

**By REV. C. G. NICOLAY, F.R.G.S.
LIBRARIAN OF KING'S COLLEGE, LONDON.**

LONDON: JOHN W. PARKER AND SON, WEST STRAND.

Now Ready, price Five Shillings,

AN ATLAS
OF
Physical and Historical Geography,
To accompany the
Manual of Geographical Science.

ENGRAVED BY J. W. LOWRY,

UNDER THE DIRECTION OF

D. T. ANSTED, M.A., F.R.S.,

PROFESSOR OF GEOLOGY IN KING'S COLLEGE, LONDON;

AND

THE REV. C. G. NICOLAY, F.R.G.S.,

LIBRARIAN OF KING'S COLLEGE, LONDON.

CONTENTS.

- I. Reference Map: The World on Mercator's Projection.
- II. Meteorological Map of the World.
- III. Relief Map of the World, shewing the Elevations of the Earth's Surface.
- IV. Phytographical Map, shewing the Distribution of Plants in various Parts of the World.
Vertical Distribution of Plants and Animals.
- V. Zoological Map, shewing the Distribution of Animals in various Parts of the World.
Ethnographical Map, shewing the Distribution of the Principal Races of Men.
- VI. Comparative Chart of Ancient and Modern Geography and Geographical Discovery.
The World according to Eratosthenes and Strabo.
The World according to Herodotus.
The World according to Ptolemy.

LONDON: JOHN W. PARKER AND SON, WEST STRAND.

STANDARD BOOKS

PUBLISHED BY

JOHN W. PARKER & SON, WEST STRAND,
LONDON.

History of Normandy and of Eng-
land. By Sir FRANCIS PALGRAVE. Vol. I.
Octavo. 21s.

Principles of Political Economy.
By J. STUART MILL. Second Edition. Two
Volumes. Octavo. 30s.

Essays on Unsettled Questions of
Political Economy. By the same. 6s. 6d.

System of Logic. By the same.
Cheaper Edition. Two Volumes. 25s.

Discourse on the Studies of the
University of Cambridge. By ADAM SEDG-
WICK, M.A., Woodwardian Professor. Fifth
Edition, enlarged. (770 pages.) 12s.

On the Influence of Authority in
Matters of Opinion. By G. CORNEWALL
LEWIS, M.P. Octavo. 10s. 6d.

Elements of Logic. By R. WHATELY,
D.D., Archbishop of Dublin. Small Octavo,
4s. 6d. Library Edition, 10s. 6d.

Elements of Rhetoric. By the same
Author. Small Octavo, 4s. 6d. Library
Edition, 10s. 6d.

Introductory Lectures on Political
Economy. By the same Author. 8s.

History of the Inductive Sciences.
By W. WHEWELL, D.D., F.R.S., Master
of Trinity College, Cambridge. Second
Edition, revised. Three Vols. £2 2s.

Philosophy of the Inductive Sciences.
By the same Author. Second Edition.
Two Volumes. Octavo. 30s.

Indications of the Creator—Theolo-
gical Extracts from History and Philo-
sophy of Inductive Sciences. By the same.
5s. 6d.

Elements of Morality. By the same.
Cheaper Edition. Two Volumes. 15s.

English Synonyms. Edited by R.
WHATELY, D.D., Archbishop of Dublin.
Second Edition, enlarged.

On the Study of Words; Five
Lectures by R. C. TRENCH, B.D., Ex-
amining Chaplain to the Bishop of Oxford.
3s. 6d.

Leaves from the Note-Book of a
Naturalist. By W. J. BROOKER, F.R.S.

History of the Royal Society, com-
piled from Original Authentic Documents.
By C. R. WELD, Assistant-Secretary of the
Royal Society. Two Volumes. Octavo. 30s.

Lectures on the Principles and
Practice of Physic. By T. WATSON, M.D.
Third Edition. Two Volumes. Octavo. 34s.

Cycle of Celestial Objects. By
Captain W. H. SMYTH, R.N., F.R.S., Foreign
Secretary of the Royal Society. Two Vols.
Octavo, with Illustrations. £2 2s.

Manual of Chemistry. By W. T.
BRANDE, F.R.S., Professor of Chemistry in
the Royal Institution. Sixth Edition, much
enlarged, and embodying all Recent Dis-
coveries. Two large Volumes. £2 5s.

Dictionary of Materia Medica and
Pharmacy. By the same Author. 15s.

Principles of Mechanism. By R.
WILLIS, M.A., F.R.S., Professor of Natural
Philosophy, Cambridge. 15s.

Mechanics applied to the Arts. By
H. MOSLEY, M.A., F.R.S., one of Her
Majesty's Inspectors of Schools. 6s. 6d.

Lectures on Astronomy. By the
same Author. Third Edition. 5s. 6d.

Elements of Meteorology. By the
late Professor DANIELL. With Plates.
Two Volumes. Octavo. 32s.

On the Nature of Thunderstorms,
and on the means of Protecting Churches
and other Buildings, and Shipping, against
the Effects of Lightning. By Sir W.
SNOW HARRIS, F.R.S. 10s. 6d.

Physiological Anatomy and Phy-
siology of Man. By Dr. TODD and W. BOW-
MAN, F.R.S. Part III., 7s. Vol I., 15s.

Connexion of Natural and Divine
Truth. By BADEN POWELL, M.A., F.R.S.,
Professor of Geometry, Oxford. 9s.

Undulatory Theory as applied to the
Dispersion of Light. By the same Author.
Octavo. With coloured Chart. 9s.

Mathematical Tracts. By G. BID-
DELL AIREY, M.A., F.R.S., Astronomer
Royal. Third Edition. Octavo. 15s.

The Philosophy of Living. By HER-
BERT MAYO, M.D. Cheaper Edition, with
Additions. 5s

Management of the Organs of Digestion in Health and in Disease. By the same Author. Second Edition. 6s. 6d.

Lunacy and Lunatic Life, with Hints on the Personal Care and Management of those affected with Derangement. 3s. 6d.

German Mineral Waters: and their rational employment for the Cure of certain Chronic Diseases. By S. SETO, M.D., Physician of the German Hospital. 7s. 6d.

Spasm, Languor, and Palsy. By J. A. WILSON, M.D., Physician to St. George's Hospital. 7s.

Gout, Chronic Rheumatism, and Inflammation of the Joints. By ROBERT BENTLEY TODD, M.D., F.R.S., Physician of King's College Hospital. 7s. 6d.

Minerals and their Uses. By J. R. JACKSON, F.R.S. With Frontispiece. 7s. 6d.

Lectures on Dental Physiology and Surgery. By J. TOMES, F.R.S., Surgeon-Dentist to the Middlesex Hospital. Octavo. With 100 Illustrations. 12s.

Instructions in the Use and Management of Artificial Teeth. By the same Author. With Illustrations. 3s. 6d.

Practical Geology and Mineralogy, By JOSEPH TRIMMER, F.G.S. Octavo, with Two Hundred Illustrations. 12s.

Practical Chemistry for Farmers and Landowners. By the same Author. 5s.

Practical Geodesy. By BUTLER WILLIAMS, C.E. New Edition, with Chapters on Estate, Parochial, and Railroad Surveying. With Illustrations. 12s. 6d.

Manual for Teaching Model-Drawing; with a Popular View of Perspective. By the same Author. (Under the Sanction of the Committee of Council on Education.) Octavo, with shaded Engravings. 15s.

Instructions in Drawing. Abridged from the above. 3s.

Chemistry of the Crystal Palace: a Popular Account of the Chemical Properties of the Chief Materials employed in its Construction. By T. GRIFFITHS. 5s.

Chemistry of the four Ancient Elements. By the same Author. Second Edition. 4s. 6d.

Recreations in Chemistry. By the same Author. Second Edition, much enlarged. 5s.

Recreations in Physical Geography; By MISS R. M. ZOERNLIN. Fourth Edition. 6s.

World of Waters; or, Recreations in Hydrology. By the same Author. Second Edition. 6s.

Recreations in Geology. By the same Author. Second Edition. 4s. 6d.

Recreations in Astronomy. By REV. L. TOMLINSON, M.A. Third Edition. 4s. 6d.

Young Italy. By A. BAILLIE COCHRANE, M.P. Post 8vo. 10s. 6d.

Wales: The Social, Moral, and Religious Condition of the People, considered especially with reference to Education. By SIR THOMAS PHILLIPS. Octavo. 14s.

Summer Time in the Country. By REV. E. A. WILLMOTT. Second Edition. 5s.

Correspondence of Sir Isaac Newton and Professor Cotes, and other unpublished Letters and Papers of Newton. Edited, with Synoptical View of Newton's Life, by J. EDLESTON, M.A., Fel. Trin. Col. Cambridge. With Portrait. Octavo. 10s.

Shipwrecks of the Royal Navy. Compiled from Official Documents. By W. O. S. GILLY. With a Preface by DR. GILLY, Canon of Durham. Second Edition. 7s. 6d.

Harmony of Scripture and Geology; or, the Earth's Antiquity in Harmony with the Mosaic Record of Creation. By J. GRAY, M.A., Rector of Diben. Second Edition. 5s.

Danger of Superficial Knowledge: A Lecture. By J. D. FORBES, F.R.S., Professor of Natural Philosophy, Edinburgh. 2s.

Introductory Lectures delivered at Queen's College, London, by

W. S. BENNETT.	REV. T. JACKSON.
DR. BROLCHI.	REV. C. KINGSLEY.
PROF. BERNAYS.	PROF. MAURICE.
PROF. BRASSEUR.	REV. C. G. NICOLAY.
REV. S. CLARK.	PROF. O'BRIEN.
PROF. HALL.	REV. A. B. STRETTILL.
JOHN HULLAH.	HENRY WARREN.

Foolslop Octavo. 5s.

The Saint's Tragedy. By C. KINGSLEY, Rector of Eversley. With Preface, by Professor MAURICE. Cheaper Edition. 2s.

Violenzia; a Tragedy. 3s. 6d.

Justin Martyr, and other Poems. By R. CHENEVIX TRENCHE. Third Edition. 6s.

Poems from Eastern Sources,—Genoveva, and other Poems. By the same Author. Second Edition. 5s. 6d.

Schiller's Complete Poems, attempted in English. By EDGAR ALFRED BOWRING. 6s.

Poems. By GEORGE MEREDITH. 5s.

Yeast: a Problem. By C. KINGSLEY, Rector of Eversley. Reprinted, with Additions, from *Fraser's Magazine*. Cheaper Edition. 5s.

College Life in the Time of James the First, as illustrated by an Unpublished Diary of Sir Symonds d'Ewes, Bart. 5s.

English Life, Social and Domestic, in the Middle of the Nineteenth Century, Second Edition. 4s. 6d.

The Professor's Wife: a Tale from the German of Auerbach. 2s. 6d.

Chance and Choice: or, the Education of Circumstances. Two Tales:—I. The Young Governess.—II. Claudine de Soligny. 7s. 6d.

Anshar: a Story of the North. By RICHARD JOHN KING. 7s.

Brampton Rectory: or, the Lesson of Life. Second Edition. 8s. 6d.

Compton Merivale: another Leaf from the Lesson of Life. By the Author of *Brampton Rectory*. 8s. 6d.

John Sterling's Essays and Tales. Edited, with Life, by Archdeacon HARE. Two volumes, with Portrait. 21s.

The City of God; a Vision of the Past, the Present, and the Future. By E. BUDGE, Rector of Bratton. 8s. 6d.

Chronicles of the Seasons; a Course of Daily Instruction and Amusement, selected from the Natural History, Science, Art, Antiquities, and Biography of our Fatherland. In Four Books, 3s. 6d. each.

The Merchant and the Friar; or, Truths and Fictions of the Middle Ages. By Sir F. PALGRAVE. Second Edition. 3s.

Tales and Stories from History. By AGNES STRICKLAND. Cheaper Edition. One Volume. 5s.

Woman's Mission. Thirteenth Edition. 2s.

Little Bracken Burners. A Tale. By LADY CALLCOTT. Third Edition. 1s. 6d.

Ethel Lea: a Story. By ANNA KING, Author of "Hours of Childhood." 2s. 6d.

Light in Darkness; or, the Records of a Village Rectory. Cheaper Edition. 2s. 6d.

Sister Mary's Tales on Natural History. Cheaper Edition. 1s. 6d.

Natural Philosophy for Beginners. Third Edition, with 143 Woodcuts. 2s.

Popular Poems, selected by ELIZABETH PARKER. Cheaper Edition. 2s. 6d.

Easy Poetry for Children. Cheaper Edition. 1s.

Introduction to English Composition. By Rev. J. EDWARDS. Fifth Edition. 2s.

Bible Biography. By E. FARR. Second Edition. 4s.

Abbott's Reader: Familiar Pieces in Prose and Verse. Fifth Edition. 3s.

History of the Christian Church. By the late Professor BURTON, of Oxford. Eighth and Cheaper Edition. 5s.

History of the Church of England. By T. VOWLER SHORT, D.D., Bishop of St. Asaph. Fifth Edition. Octavo. 16s.

Burnet's History of the Reformation, abridged. Edited, with Additions, by Professor CORRIE, Master of Jesus College, Cambridge. 10s. 6d.

History of the English Reformation. By F. C. MASSINGBERD, M.A., Rector of South Ormsby. Second Edition. 6s.

History of Popery; the Origin, Growth, and Progress of the Papal Power; its Political Influence, and Effects on the Progress of Civilization. 9s. 6d.

Anglo-Saxon Church, its History, Revenues, and General Character. By H. SOAMES, M.A. Third Edition. 10s. 6d.

Elizabethan Religious History. By the same Author. Octavo. 16s.

Ullmann's Gregory of Nazianzum. A Contribution to the Ecclesiastical History of the Fourth Century. Translated by G. V. COX, M.A. 6s.

Neander's Julian the Apostate and his Generation: an Historical Picture. Translated by G. V. COX, M.A. 3s. 6d.

Dahlmann's Life of Herodotus, drawn out from his Book. With Notes. Translated by G. V. COX, M.A. 5s.

Student's Manual of Ancient History. By W. COOKE TAYLOR, LL.D. Fifth Edition. 10s. 6d.

Student's Manual of Modern History. By the same Author. Fifth Edition, with New Supplementary Chapter. 10s. 6d.

History of Mohammedanism. Cheaper Edition. By the same Author. 4s.

History of Christianity. By the same Author. 6s. 6d.

Crusaders; Scenes, Events, and Characters from the Times of the Crusades. By T. KIGHTLEY. 7s.

The Lord and the Vassal; a Familiar Exposition of the Feudal System. 2s.

French Revolution; its Causes and Consequences. By F. M. ROWAN. 3s. 6d.

Labrousse's History of Napoleon's Invasion of Russia. 2s. 6d.

Historical Sketch of the British Army. By G. R. GLEIG, M.A., Chaplain General to the Forces. 3s. 6d.

Family History of England. By the same Author. With numerous Illustrations. Three Volumes. 6s. 6d. each.

School History of England, abridged from Gleig's Family History of England; with copious Chronology, List of Contemporary Sovereigns, and Questions. 6s.

Familiar History of Birds. By E. STANLEY, D.D., Bishop of Norwich. Fifth Edition, with numerous Illustrations. 5s.

Domesticated Animals. By MARY ROBERTS. 3s. 6d.

Wild Animals. By the same. 3s. 6d.

Amusements in Chess. By C. TOMLINSON. 4s. 6d.

Musical History, Biography, and Criticism. By GEORGE HOGARTH. Two Volumes. 10s. 6d.

Memoir of Bishop Copleston, with Selections from his Diary and Correspondence. By W. J. COPLESTON, M.A., Rector of Cromhall. 10s. 6d.

Life of Archbishop Usher. By C. R. ELLINGTON, D.D., Regius Professor of Divinity, Dublin. Portrait. Octavo. 12s.

Life of Archbishop Sancroft. By the late Dr. D'OLY. Octavo. 9s.

Lives of Eminent Christians. By R. B. HONE, M.A., Archdeacon of Worcester. Four Volumes. 4s. 6d. each.

Memoirs of the Life, Character, and Writings, of Bishop Butler. By T. BARTLETT, M.A., Rector of Kingstoune. 12s.

Bishop Jeremy Taylor; his Predecessors, Contemporaries, and Successors. By Rev. R. A. WILLMOTT. Second Edition. 5s.

Lives of English Sacred Poets. By the same Author. Two Vols. 4s. 6d. each.

Life and Services of Lord Harris. By the Right Hon. S. R. LUSHINGTON. Second Edition. 6s. 6d.

Notes on the Parables. By R. C. TRENCH, B.D. Examining Chaplain to the Bishop of Oxford. Fourth Edition. Octavo. 12s.

Notes on the Miracles. By the same Author. Third Edition. 12s.

St. Augustine's Exposition of the Sermon on the Mount. With an Essay on St. Augustine as an Interpreter of Scripture. By R. C. TRENCH, B.D. Second Edition. 7s. The Essay separately, 3s. 6d.

Literature of the Church of England; Specimens of the Writings of Eminent Divines, with Memoirs of their Lives and Times. By R. CATTAMOLE, B.D. Two volumes. Octavo. 25s.

Essays on Peculiarities of the Christian Religion. By R. WHATELY, D.D., Archbishop of Dublin. Cheaper Edition. 7s. 6d.

Essays on Difficulties in the Writings of the Apostle Paul. By the same Author. Cheaper Edition. 8s.

Essays on Errors of Romanism. By the same. Cheaper Edition. 7s. 6d.

Essays on Dangers to Christian Faith from the Teaching or the Conduct of its Professors. By the same Author. 10s.

Mission of the Comforter. By J. C. HARE, M.A., Archdeacon of Lewes. Second Edition. Octavo. 12s.

The Victory of Faith. By the same Author. Second Edition. 6s.

Parish Sermons. By the same Author. Two Series. Octavo. 12s. each.

The Old Testament. Nineteen Sermons on the First Lessons for the Sundays between Septuagesima Sunday and the First Sunday after Trinity. By F. D. MAURICE, M.A., Professor of Divinity, King's College. 6s.

The Church a Family: Sermons on the Occasional Services of the Prayer-Book. By the same Author. 4s. 6d.

The Prayer Book; specially considered as a Protection against Romanism. By the same Author. 5s. 6d.

The Lord's Prayer. Nine Sermons. By the same Author. Third Edition. 2s. 6d.

The Religions of the World, and their Relations to Christianity. By the same Author. Cheaper Edition. 5s.

Lectures on the Epistle to the Hebrews. By the same. 7s. 6d.

Christmas Day, and other Sermons. By the same Author. Octavo. 10s. 6d.

Lectures on the Characters of our Lord's Apostles. By a Country Pastor. 8s. 6d.

Lectures on the Scripture Revelations respecting Good and Evil Angels. By the same Author. 3s. 6d.

View of the Scripture Revelations respecting a Future State. Sixth Edition. By the same Author. 5s.

Twenty-five Village Sermons. By C. KINGSLEY, jun., Rector of Everaley. 5s.

Churchman's Theological Dictionary. By R. EDEN, M.A., Chaplain to the Bishop of Norwich. Second Edition. 5s.

The Gospel-Narrative according to the Authorized Text, without Repetition or Omission. With a Continuous Exposition, Marginal Proofs in full, and Notes. By J. FORSTER, M.A., Her Majesty's Chaplain of the Savoy. Fourth Edition, 12s.

Statutes relating to the Ecclesiastical and Eleemosynary Institutions of England, Wales, Ireland, India, and the Colonies; with Decisions. By A. J. STEPHENS, M.A., F.R.S. Two large Volumes, with copious Indices, £3 3s.

Exposition of the Thirty-Nine Articles, Historical and Doctrinal. By E. H. BROWNE, M.A., Prebendary of Exeter; The First Volume. Octavo. 10s. 6d.

The Churchman's Guide; an Index of Sermons and other Works, arranged according to their subjects. By JOHN FORSTER, M.A. Octavo. 7s.

Manual of Christian Antiquities. By J. E. RIDDLE, M.A., Bampton Lecturer, Oxford. Second Edition. 18s.

Luther and his Times. By the same Author. 5s.

Churchman's Guide to the Use of the English Liturgy. By the same Author. 3s. 6d.

First Sundays at Church. By the same Author. Fifth Edition. 3s. 6d.

The Early Christians. By the Rev. W. FRIEDEN, M.A. Fourth Edition. 4s.

The Book of the Fathers, and the Spirit of their Writings. 9s. 6d.

Edited for the Syndics of the Cambridge University Press.

Sanderson De Obligatione Conscientiæ - Prælectiones Decem Oxoni in Schola Theologica Habitiæ. With English Notes, including an abridged Translation by W. WHREWELL, D.D., Master of Trinity College. Octavo. 9s.

The Homilies, with various Readings, and the Quotations from the Fathers given at length in the Original Languages. Edited by G. E. CORRIE, B.D., Master of Jesus College, and Norrisian Professor of Divinity. Octavo. 10s. 6d.

Pearson on the Creed. Revised and Corrected by TEMPLE CHEVALLIER, B.D., Professor of Mathematics, Durham. 12s.

* * In this edition the folio of 1669 has been taken as the principal model of the text, and the quotations from the Fathers have been verified throughout. The passages from the Rabbinical writings and Chaldeæ paraphrases have been carefully collated.

Twysden's Historical Vindication of the Church of England in point of Schism. Edited, with the Author's MS. Corrections, by Professor CORRIE. 7s. 6d.

Archbishop Usher's Answer to a Jesuit; with other Tracts on Popery. Octavo. 13s. 6d.

Dr. Hey's Lectures on Divinity. Third Edition. Two Volumes. Octavo. 30s.

Wilson's Illustration of the Method of Explaining the New Testament. Edited by T. TUTOR, D.D., Bishop of Ely. 8s.

Church of St. Patrick; an Inquiry into the Independence of the Ancient Church of Ireland. By W. G. TODD, A.B. 4s.

Civil History of the Jews, from Joshua to Hadrian. By O. COCKAYNE, M.A., King's College. Second Edition, 4s. 6d.

Cudworth on Freewill; now first Edited, with Notes, by J. ALLEN, M.A., Archdeacon of Salop. 3s.

Manual of the Antiquities of the Christian Church. By Professor GUERICK, of Halle. Translated and Adapted to the Use of the English Church, by A. J. W. MORRISON, B.A., Master of Grammar School, Truro. 5s. 6d.

Garrick's Mode of Reading the Liturgy. With Notes, and a Discourse on Public Reading. By R. CULL. 5s. 6d.

Ordo Sæclorum; a Treatise on the Chronology of the Holy Scriptures. By H. BROWNE, M.A., Canon of Chichester. 20s.

Observations on Dr. Wiseman's Reply to Dr. Tutton's Roman Catholic Doctrine of the Eucharist Considered. By T. TRATON, D.D., Bishop of Ely. 4s. 6d.

James's Treatise on the Corruptions of Scripture, Councils, and Fathers, by the Prelates, Pastors, and Pillars of the Church of Rome. Revised by J. E. COX, M.A., Vicar of St. Helen's, Bishopsgate. 12s.

Fullwood's Roma Ruit. The Pillars of Rome Broken. New Edition, by C. HARDWICK, M.A., Fellow of St. Catharine's Hall, Cambridge. Octavo. 10s. 6d.

The Scriptural Character of the English Church considered. With Notes. By DERWENT COLBRIDGE, M.A., Principal of St. Mark's College. Octavo. 12s. 6d.

College Lectures on Ecclesiastical History. By W. BATES, B.D., Fellow of Christ's College, Cambridge. Second Edition. 6s. 6d.

College Lectures on Christian Antiquities, and the Ritual. By the same Author. 9s.

Hints for an Improved Translation of the New Testament. By J. SCHOLFIELD, M.A., Professor of Greek, Cambridge. Third Edition. 3s. 6d.

Choral Service of the Church: an Inquiry into the Liturgical System of the Cathedral and Collegiate Foundations of the Anglican Communion. By J. JESS, M.A., Rector of Peterstow. 16s.

Rituale Anglo-Catholicum; or, the Testimony of the Catholic Church to the Book of Common Prayer. By H. BAILEY, B.D., Warden of St. Augustine's College, Canterbury. Octavo. 15s.

The Personality of the Tempter, and other Sermons, Doctrinal and Occasional. By C. J. VAUGHAN, D.D., Head Master of Harrow School, Chaplain in Ordinary to the Queen. Octavo. 7s. 6d.

Commentary on the Epistle of Paul the Apostle to the Romans; with a New Translation and Notes. By W. WITHERS EWBANK, M.A., Incumbent of St. George's, Everton. Two Vols. 5s. 6d. each.

Sermons preached before the University of Oxford. By C. A. OGILVIE, D.D., Canon of Christ Church. Octavo. 5s.

Lectures on the Prophecies, proving the Divine Origin of Christianity. By A. M'CAUL, D.D., Professor of Divinity in King's College, London. Octavo. 7s.

Two Series of Discourses. I. On Christian Humiliation. II. On the City of God. By C. H. TRAROT, D.D., Bishop of Edinburgh. Octavo. 7s. 6d.

College Chapel Sermons. By W. WHEWELL, D.D., Master of Trinity College, Cambridge. 10s. 6d.

The Liturgy as it is, illustrated in a Series of Practical Sermons. By H. HOWARTH, B.D., Rector of St. George, Hanover Square. Second Edition. 4s. 6d.

Sermons. By J. O. W. HAWES, M.A., Morning Preacher at the Magdalen Hospital. 5s. 6d.

Practical Sermons, by Dignitaries and other Clergymen. Edited by J. C. CROTHWAITE, M.A., Rector of St. Mary-at-Hill. Three Volumes. Octavo. 7s. each.

Short Sermons for Children, illustrative of the Catechism and Liturgy. By the Rev. C. A. JOHN, B.A. 3s. 6d.

The Calling of a Medical Student; Four Sermons preached at King's College, London. By E. H. PLUMPTRE, M.A., Chaplain and Divinity Lecturer. 1s. 6d.

Butler's Three Sermons on Human Nature, and Dissertation on Virtue. With Preface and Syllabus, by W. WHEWELL, D.D. Second Edition. 3s. 6d.

Butler's Six Sermons on Moral Subjects. With Preface and Syllabus, by Dr. WHEWELL. 3s. 6d.

Village Lectures on the Liturgy. By W. PALIN, Rector of Stifford. 3s. 6d.

The Holy City; Historical, Topographical, and Antiquarian Notices of Jerusalem. By G. WILLIAMS, B.D., Fellow of King's College, Cambridge. Second Edition, with numerous Illustrations and Additions, and a plan of Jerusalem. Two large Volumes. £2 5s.

* * * The Plan is published separately, with a Memoir, 9s.; or Mounted on Rollers, 18s.

History of the Holy Sepulchre. By Professor WILLIS. Reprinted from Williams's Holy City. With Illustrations. 9s.

Notes on German Churches. By W. WHEWELL, D.D., Master of Trinity College, Cambridge. Third Edition. 12s.

The Six Colonies of New Zealand. By W. FOX. 3s. With large Map by Arrowsmith, 4s. 6d.

Handbook for New Zealand. Recent Information, compiled for the Use of Intending Colonists. 6s.

View of the Art of Colonization. By E. GIBBON WAKEFIELD. Octavo. 12s.

Travels in the Track of the Ten Thousand Greeks; a Geographical and Descriptive Account of the Expedition of Cyrus. By W. F. AINSWORTH. 7s. 6d.

Travels and Researches in Asia Minor, Mesopotamia, Chaldea, and Armenia. By the same Author. Two Vols., with Illustrations. 24s.

Gazpacho; or, Summer Months in Spain. By W. G. Clark, M.A., Fellow of Trinity College, Cambridge. Cheaper Edition. 5s.

Auvergne, Piedmont, and Savoy: a Summer Ramble. By C. R. WELD. 8s. 6d.

Wanderings in the Republics of Western America. By GEORGE BYAM. With Illustrations. 7s. 6d.

Wild Life in the Interior of Central America. By the same Author. 5s.

Hesperos; or, Travels in the West. Two Volumes. By Mrs. HOUSTOUN. 14s.

Commentary on the Cuneiform Inscriptions of Babylonia and Assyria. By Lieut.-Colonel RAWLINSON. Octavo. 3s.

Port Phillip in 1849. By Dr. CLUTTERBUCK, Nine Years Resident in the Colony. With a Map. 3s.

Charters of the Old English Colonies in America. With Introduction and Notes. By S. LUCAS, M.A. 4s. 6d.

Canterbury Papers. Nos. I. to VIII. 6d. each; in a wrapper, 4s. Nos. IX. and X., 1s. No. XI., with Four Views of the Canterbury Settlement, 1s. 6d.

Hints on Church Colonization. By J. C. WYNTER, M.A., Rector of Gatton. 6d.

Captain Cook's Voyages; with Accounts of Pitcairn's Island, and the Mutiny of the Bounty. Fourth Edition. 2s. 6d.

Christopher Columbus; his Life, Voyages, and Discovery of the New World. Third Edition. 2s. 6d.

Mungo Park; his Life and Travels, with an Account of his Death, and of later Discoveries. Third Edition. 2s. 6d.

Humboldt's Travels and Discoveries in America. Second Edition. 2s. 6d.

GERMAN WORKS FOR LEARNERS,

By PROFESSOR BERNAYS, of King's College.

German Grammar. 5s.

German Exercises. 5s. 6d.

German Examples. 3s.

German Reader. 5s.

German Historical Anthology. 5s.

German Poetical Anthology. 7s.

GERMAN CLASSICS,

With English Notes, by PROFESSOR BERNAYS.

Schiller's Maid of Orleans. 2s.

Schiller's William Tell. 2s.

CLASSICAL TEXTS,

Carefully Revised by C. BADHAM, M.A., of Louth; PROFESSOR BROWNE, of King's College; W. HAIG BROWN, M.A.; DR. DONALDSON, of Bury; DR. MAJOR, of King's College; PROFESSOR PILLANS, of Edinburgh, &c. &c.

CICERO de SENECTUTE. 1s.

CICERO de AMICITIA. 1s.

CICERO de OFFICIIS. 2s.

CICERO pro PLANCIO. 1s.

CICERO pro MILONE. 1s.

CICERO pro MURENA. 1s.

CICERONIS ORATIO PHILIPPICA SECUNDA. 1s.

TACITI GERMANIA. 1s.

TACITI AGRICOLA. 1s.

EXCERPTA ex TACITI ANNALIBUS. 2s. 6d.

CÆSAR de BELLÒ GALlico. I. to IV. 1s. 6d.

VIRGILII GEORGICA. 1s. 6d.

OVIDII FASTI. 2s.

HORATII SATIRÆ. 1s.

HORATII CARMINA. 1s. 6d.

HORATII ARS POETICA. 6d.

TERENTII ANDRIA. 1s.

PLATONIS PHÆDO. 2s.

PLATONIS MENEXENUS. 1s.

PLATONIS PHÆDRUS. 1s. 6d.

EXCERPTA ex ARRIANO. 2s. 6d.

SOPHOCLES PHILOCTETES, with Notes. 2s.

SOPHOCLES ŒDIPUS TYRANNUS, with Notes. 2s. 6d.

EURIPIDIS BACCHÆ. 1s.

ÆSCHYLI EUMENIDES. 1s.

PLUTARCH'S LIVES of SOLON, PERICLES, and PHILOCRATES. 2s.

Outlines of History of England. 1s.

Outlines of History of Ireland. 1s.

Outlines of History of France. 1s. 3d.

Outlines of Roman History. 10d.

Outlines of Grecian History. 1s.

Outlines of Sacred History. 2s. 6d.

Outlines of History of British Church. 1s. 6d.

Outlines of Geography. 10d.

Outlines of Physical Geography. 10d.

Outlines of Astronomy. 10d.

Arundines Cami, sive Musarum Cantabrigiensium Lusus Canori, collegit atque edidit HENRICUS DUNAY, M.A. Fourth Edition. 12s.

The New Cratylus; Contributions towards a more Accurate Knowledge of the Greek Language. By J. W. DONALDSON, D.D., Head Master of King Edward the Sixth's School, Bury St. Edmund's. Second Edition, Octavo, much enlarged. 18s.

Agamemnon of Æschylus, the Text, with a Translation into English Verse, and Notes. By J. CONINGTON, M.A., Fellow of University College, Oxford. 7s. 6d.

Æschylus translated into English Verse. With Notes, Life of Æschylus, and a Discourse on Greek Tragedy. By Professor BLACKIE, of Aberdeen. Two Volumes. 16s.

Phædrus, Lysis, and Protagoras of Plato. Translated by J. WRIGHT, M.A., Master of Sutton Coldfield School. 4s. 6d.

Homeric Ballads: the Text, with Metrical Translations and Notes. By the late Dr. MAGINN. 6s.

Tacitus, the Complete Works, with a Commentary, Life of Tacitus, Indices, and Notes. Edited by Professor RITTER, of Bonn. Four Volumes. Octavo. 28s.

Aristophanis Comædiæ Undecim, cum Notis et Indicibus Historicis, edidit HERBERTUS A. HOLDEN, A.M. Coll. Trin. Cant. Socius. Octavo. 15s.

Aulularia and Menæchmi of Plautus, with Notes by J. HILDYARD, B.D., Fellow of Christ's Coll., Camb. 7s. 6d. each.

Antigone of Sophocles, in Greek and English, with Notes. By J. W. DONALDSON, D.D., Head Master of Bury School. 9s.

Pindar's Epinician Odes, revised and explained; with copious Notes and Indices. By Dr. DONALDSON. 16s.

Becker's Gallus; or, Roman Scenes of the Time of Augustus, with Notes and Excursus. Translated by F. METCALFE, M.A. Second Edition. 12s.

Becker's Charicles; or, Illustrations of the Private Life of the Ancient Greeks. Translated by F. METCALFE, M.A. 12s.

Speeches of Demosthenes against Aphobus and Onetor, Translated, with Explanatory Notes, by C. RANN KENNEDY, M.A., Fellow of Trin. Coll., Camb. 9s.

Selection from the Greek Verses of Shrewsbury School. By B. H. KENNEDY, D.D., Head Master of Shrewsbury School. 8s.

Select Private Orations of Demosthenes: with English Notes. By the Rev. C. T. PENROSE, M.A., Head Master of Sherborne School. 5s.

Frogs of Aristophanes; with English Notes. By the Rev. H. P. COOKESLEY. 7s.

Classical Examination Papers of King's College. By R. W. BROWN, M.A., Professor of Classical Literature. 6s.

Fables of Babrius. Edited by G. C. LEWIS, M.A. 5s. 6d.

Cambridge Greek and English Testament. Edited by Professor SCHOLEFIELD. Third Edition. 7s. 6d.

Sacred Latin Poetry; with Notes and Introduction. By R. C. TRENCHE, B.D. 7s.; or 14s. bound in antique calf.

Commentary on the Book of the Acts of the Apostles. By W. G. HUMPHRY, B.D., Examining Chaplain to the Lord Bishop of London. Octavo. 7s.

Greek Text of the Acts of the Apostles; with English Notes. By H. ROBINSON, D.D. 8s.

Bœckh's Public Economy of Athens. Translated by G. C. LEWIS, A.M., M.P. 8vo. 18s.

Schleiermacher's Introductions to the Dialogues of Plato. Translated by W. DOBSON, M.A., Fellow of Trinity College, Cambridge. 12s. 6d.

New Hebrew Lexicon. Hebrew and English, arranged according to the permanent letters in each word. English and Hebrew. With Hebrew Grammar, Vocabulary, and Analysis of Book of Genesis. Also, Chaldee Grammar, Lexicon, and Analysis of Old Testament. By T. JARRETT, M.A., Professor of Arabic, Cambridge. 21s.

Guide to the Hebrew Student. By H. H. BERNARD, Teacher of Hebrew, Cambridge. 10s. 6d.

The Psalms in Hebrew, with Critical, Exegetical, and Philological Commentary. By G. PHILLIPS, B.D., Fellow and Tutor of Queen's College, Cambridge. Two Volumes. 32s.

Elements of Syriac Grammar. By G. PHILLIPS, B.D. Second Edition. 10s.

Practical Arabic Grammar. By DUNCAN STEWART. Octavo. 16s.

Analysis of the Text of the History of Joseph. By A. OLLIVANT, D.D., Lord Bishop of Llandaff. 6s.



